AUG 23 1922

THE GEOGRAPHICAL JOURNAL

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Vol. LX No. 2 August 1922

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The Geographical Journal

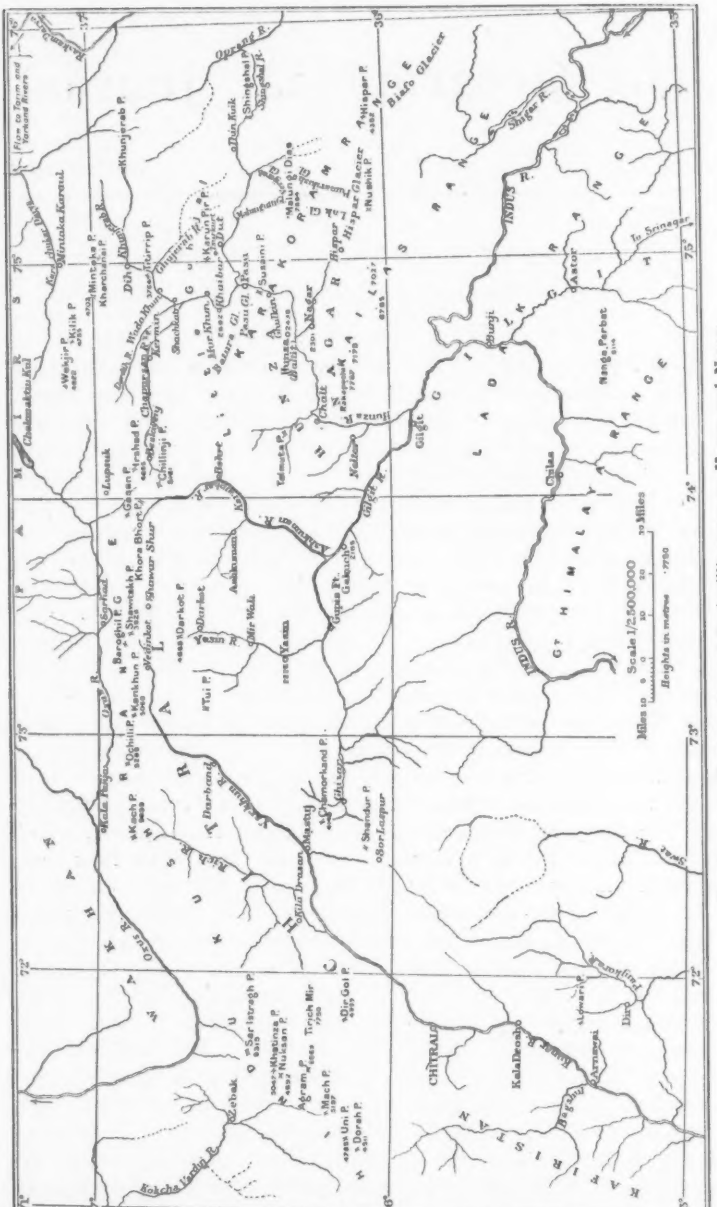
Vol. LX No. 2 August 1922

BYWAYS IN HUNZA AND NAGAR

Brigadier-General G. K. Cockerill, C.B., M.P.

Read at the Meeting of the Society, 6 February 1922.

MY purpose to-night is to describe to you some of the lesser-known valleys of Hunza and Nagar. It is nearly thirty years since I visited them, and I should not have faced the difficult task of recording impressions formed so long ago but for two reasons. The first is that it was under our President's direction that my explorations were undertaken. Since he thinks an account of some of them might be of interest to you, it is naturally the greater pleasure to me to speak in his presence and under his presidency. The second reason that prompts me to give this lecture is that I am anxious to draw attention to the fact that there is still a large unexplored area in and about that portion of the map of Asia lying between 35° 15′ and 37° 15′ lat. N. and 71° 15′ and 75° 45′ long. E., the lines which mark the limits of my work in this region. It is here that the Himalayas, and the parallel ranges known as the Ladak, Kailas, and Karakoram, meet the Hindu Kush almost at a right angle. This sharp turn in the line of the vast mountain chain corresponds with a similar turn in the course of the river Indus. The axis of the great bend seems to lie between two points which are themselves of some geographical interest: Nanga Parbat to the south, where the great Himalaya is supposed to end; and, to the north, a point about 6 miles west of the Kilik pass, which also happens to be the apex of the pyramid formed by the basins of the Oxus, Indus, and Tarim. East of this axis, between the upper Indus and the Karakoram and parallel to them, one may distinguish a number of great troughs. They lie mainly in Hunza and Nagar and drain into the Hunza river. One of them, the Hispar Valley, is filled with the longest glacier in the world outside the Arctic regions. West of the axis, between the Indus and the Hindu Kush and parallel to the course of the Indus below its great bend, lie other troughs, not perhaps so well marked, but, as I think, practically continuous with the former. These latter valleys lie in Chitral. Most of them I have seen, but I have no time to describe them this evening. I must confine myself here to saying that it is possible to follow an almost continuous trough, that traces a bold curve extending north-west from near the Shingshal pass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Hispar Glacier
Baltoro Glacier
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Haramosh
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Karakoram Range
Himalaya Range
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Gircha

in the east, where it is called Ghujerab, westwards by the Chapursan, Upper Karambar, and Upper Yarkhun valleys, and then south-west as far at least as the Ishpirin defile (Darband) and perhaps to Chitral, and even to Jelalabad. Through and across this and its parallel concentric valleys great radial fissures appear to have opened at the bend, just as the bark cracks when you bend a green sapling. One such fissure opens south from the Darkot pass. North of this pass bifurcating glaciers run north-east and north-west to Shawar Shur and Vedinkot; south of it are precipitous cliffs and gorges, through which the Yasin river flows down to join the Gilgit river. Another fissure is that through which the Karambar river drains south to the Gilgit. A third is that through which the Hunza river, in a series of stupendous gorges, bursts in succession through the Karakoram, Kailas, and Ladak ranges on its way to the Indus.

It was in the summer of 1892 that I received orders to proceed to Gilgit and to undertake the fuller exploration of the eastern Hindu Kush region. I followed the usual route by Srinagar, across the Wular lake and over the Tragbal pass to Gurais, and thence by the Burzil pass and Bunji, in the valley of the Indus, to Gilgit. This road has often been described to you, and I need say little about it. It was, at the time I speak of, just being made. I have memories of the most appalling heat in the gorge through which the Astor river cuts through to the Indus, a gorge appropriately called Shaitan Nara, or the Devil's Gap. I still see the vision of the great snow mass of Nanga Parbat rising sheer beyond the Indus. I remember, too, the kindly hospitality of the officers at Bunji. They induced me to stay and dine with them, telling me the road ahead was very simple. I crossed the Indus by a new bridge; was overtaken by a violent thunderstorm, and shortly afterwards found a line of stones apparently intended to close the path. To my right there was a precipitous descent, which proved impassable in the dark, so I turned back and tried the main road again. I had gone but a few hundred yards, when suddenly my horse again refused to move. I could see nothing but blackness. There came a flash of lightning, and I found myself standing where the half-finished road ended in space.

Arrived in Gilgit, I was at once ordered to Hunza, where I stayed for a few weeks, raising and training Hunza levies. These men afterwards did gallant work in the relief of Chitral. Then I received orders to reconnoitre the Shingshal route to Raskam and Sarikol. Our President, Captain Younghusband as he then was, had visited the Shingshal pass from the Sarikol side of the watershed, but, as he was anxious to visit the Khunjerab pass as well before proceeding to Hunza by the Mintaka, he had necessarily to turn back from the Shingshal. My orders were to proceed from Hunza up the Shingshal river to the point where he turned back, and so to complete his work. The road north from Gilgit through Hunza is really a main road from Kashmir to Kashgar. The road east and west from Gilgit to Mastuj is also of great importance. In

the long-distant past it formed the means of communication between the Tibetans and the Arabs when waging a joint campaign against China. Of these routes I had an excellent map. Colonel Lockhart's mission had passed through the country, and Colonel Woodthorpe, who accompanied it, produced a map which, checked long afterwards with the triangulation series, which was made through Hunza in 1913 in order to connect the Indian and Russian Surveys, proved perfectly accurate. It is a remarkable piece of topography. It was my task to fill in many of the gaps which, through lack of time, Colonel Woodthorpe had had to leave unsurveyed. Without his map, I should have found my task impossible.

I left Hunza on 2 November 1892. In addition to eight or ten coolies who carried my baggage, my party consisted of three sepoys of the Kashmir Regiment to which I was then attached, a Hindustani cook and a Hunza man, named Abdulla, who spoke Hindustani as well as his native tongue of Burishaski, and who understood the language spoken in Gujhal. He was a man of splendid physique, and a wonderful cragsman. About 7 miles from Hunza there is the débris of a vast landslip hundreds of feet high, which, when it fell, choked the gorge. The mass stood firm for six months. When it gave way the flood swept through Hunza, widening the ravine which separates that state from Nagar by many hundreds of feet, and bringing annihilation upon the fields and orchards. Just above this slip the Hunza river cuts through the Karakoram range. Precipices of gneiss and granite rise to an appalling height, and the river takes a sharp turn. This gorge forms the boundary between Hunza proper and Little Gujhal, or Hirbar, to give it the native name. The Hunzakuts south of the gorge are of the Burish stock, speaking the Burishaski language. The tillers of the soil are known as Birchik, but men of position among them are called Kanjutis both by the Gujhalis and the Chinese. In Yasin, too, such tillers of the soil as are of Burish stock and speak the Burishaski language are called Warshik. More attention might well be paid to this language, and to other languages spoken in this part of the world. There are some which bear a strong resemblance to the Gipsy language (Romany) if my information on this point was correct.

Proceeding north, I skirted the great Pasu glacier and camped at Pasu, where I found the son of the Mukaddam of Shingshal awaiting me with two or three Shingshalis. I asked if I could take a horse with me to Shingshal. "No!" "Could I take my dog?" I received the sinister reply that I could not take a goat by the road by which we should travel. The next morning we left Pasu and proceeded north for some 2 miles, and then turned east to enter the narrow forbidding Shingshal gorge. It is strange how every traveller who has been along the main route has expressed the wish to explore the valley beyond, but no one before, or, so far as I can learn, since, has had time even to enter the gorge. At every step it grows narrower, and the gloom deeper and deeper. After 4 miles we had to send our ponies back. Behind us the

THE SHINGSHAL GORGE

LOOKING TOWARDS HISPAR PASS FROM ABOVE SHINGSHAL RIVER

river was a deep and rapid stream, gliding silently over a stony bed. In summer the whole of the gorge is filled with a tumbling mass of yellow, mud-laden glacier water. In November the volume was less but still formidable. In front of us the cliffs of fine-grained, pale grey limestone rose precipitously to a vast height on either hand, and the space between narrowed to less than 50 yards. This was filled by a chaos of huge boulders, piled in the utmost confusion at the foot of the cliffs. The roar of the waters, as they crashed foaming from rock to rock, woke a thousand echoes in the precipices above. With this deafening din in our ears we stumbled slowly through the trackless waste. At length we came to an abrupt standstill. On the far side a buttress of rock rose to a height of about 700 feet. The torrent was absolutely impassable. The only path lay along the cliffs on the right bank. These had been ground and polished by the action of the summer floods, but some 15 feet above the point we had reached a narrow ledge could be seen leading to higher ledges. I was wondering how we could climb this when one of the guides doubled a rope and threw it over a tree branch fixed in a narrow cleft between two shoulders of rock nearly level with the ledge above. Up this rope first one and then another clambered, and loads were drawn up by the same means. Pushed from below and hauled from above I went up in much the same way. The next 50 yards we followed an ever-narrowing ledge of rock over which the cliff bent closer and closer, until forced to our knees and then compelled to wriggle like serpents, until finally we dropped feet foremost into a little rocky cup formed by a summer waterfall, and from thence on to further ledges from which at last we reached the river-bed again. In no other valley of the Hindu Kush is anything wilder or more desolate to be found. Not a gleam of sunshine reaches the bottom of the gorge; the river-bed is choked with boulders of enormous size, and two, leaning one against the other, form a cave which could shelter forty or fifty men. Here we spent the night.

For 8 miles the character of the gorge remains unchanged. Occasionally side streams flow in through clefts only 2 or 3 yards wide, riven sheer through the cliffs for 1000 feet. Then the valley opens a little, and here, at the place called Dut, which means a rope and basket bridge, the summer road into the valley comes in from the north. I shall speak of this later. Beyond Dut we had to climb a spur 2700 feet above us, and night fell before we reached the top of the ridge. We made a terrifying descent down the other side in the dark. My only bottle of whisky had been broken the previous day, and here, I remember, we lost the whole of our small store of flour as well. One of the coolies dropped the bag, and we heard it bounding from rock to rock as it fell into the dark void below. Without whisky and without bread we camped in the river-bed opposite a shrine. No native would cross the river, since it meant death within the year. Even the cliff was said to be sacred, and flood water powerless against it. Just as I was being told of this, a great bit of the

sacred cliff came tumbling down into the river, and was carried away by the impious stream!

The next day we passed round the snout of a great glacier called Malungutti. This comes down to the very edge of the river, from which it rises sheer: an ice-wall of wonderful colouring—below of deepest green, but graduating to an ethereal tone of emerald above—and surmounted by fantastic spires and pinnacles of every form and size. "Looking up the valley from which it issues one sees a great double-headed mountain, extraordinarily bold and massive, which the natives call Malungi Dias. The Malungutti glacier, as far as I could tell, does not descend from this mountain, but, rising far to the south of it, sweeps round its base. The two peaks, whose altitude can scarcely be less than 24,000 feet, are connected by a ridge, in height hardly inferior. For grandeur of form and prominence of position, there is no feature in the whole Shingshal valley more striking than this magnificent mountain." So I wrote in 1894. Some twenty years later the surveyors, who made the connecting link between the Indian and the Russian triangulations, fixed the position of this mountain, which they call Dumáta. The corrected position is within 5″ of latitude and 18″ of longitude of the position fixed by me with a cavalry sketching-board. Its height is given as 25,868 feet. It thus proves to be higher than any fixed peak either in the Hindu Kush or the Karakoram range west of K_2. It is clearly shown in the photograph taken from Tomtek, 18,600 feet, at a distance of 60 miles. My view is from the same angle, but only from 15 miles.

The Malungutti glacier has in the past filled in the whole valley and blocked the Shingshal river. The river now cuts sharply through the old moraine, and through the old bed of the lake that formed above it. Above the glacier the road is much easier. The village of Shingshal lies at a height of 10,000 feet on the left bank of the river in a crescent-shaped bay, 1500 yards long by 600 yards wide, nearly the whole of which is cultivated in terraces with barley and buckwheat. Above Shingshal the path remains easy. The summer path, which lies over four passes of about 14,000 feet, turns off to the left up the Zardigarbin stream, and about 4 miles east of Shingshal the Shingshal river swings round to the south-east; at the bend a gorge, so narrow that it is scarcely visible, comes in from the north-east. This stream is called Tang, and near its head lies the Shingshal pass. There is at first no path in the gorge, and a rough scramble up cliffs on the left bank brings one to a broad open plain, much scored with the tracks of game. From this a good view is obtained of the Shingshal valley to the south-east. The Verijerab glacier, the cause of the disastrous floods that years ago swept down the Shingshal river and destroyed much of the village, is seen at a short distance protruding from a steep ravine. It stretches nearly to the opposite bank. Beyond it a snowy peak blocks the view, but the valley seems to sweep round to south, and, somewhere near the Hispar pass, is lost amid the snows.

Crossing the plain the path gets worse. Here a single gnarled tree branch projects from a seamless cliff, here a fragile wooden staircase descends dizzily. Finally, after reaching a height of 12,000 feet, the track plunges down precipitous rocky faces to the very edge of the Tang stream. The gorge here is but 15 yards wide, a mere rift in the black rock. We scrambled over great boulders, past frozen waterfalls—the water pouring through a sheath of ice—across ice bridges, and forded the torrent fourteen times till we reached a place called Thin Kuik, which means "Hot Spring." The Shingshalis were much tickled at my being able to pronounce "Thin," which their neighbours called "Din." The temperature fell to 7° Fahr. and the night was bitterly cold. With me was the son of the Mukaddam of Shingshal, who I found was one of the party of Kanjutis who had confronted Captain Younghusband at the Darband on the far side of the Shingshal pass, when he visited the pass from the east. Taking him and Abdulla, my faithful Hunza servant, with me, I started out the next day to reach the point where Captain Younghusband turned back. We had to traverse a rotten cliff where a tree-trunk thrown across a chasm often formed the only path. Then came a very stiff climb of 1000 feet to a broad shelving plain, over which, for 2 or 3 miles, the path is so good as to almost deserve the name of a road. Here at the edge of the cliff which overlooks the right bank of a ravine was a cairn of stones, which I was assured was built by the men who had accompanied Captain Younghusband, to mark the farthest point he reached. I should have liked to go on to the actual crest, but I had orders to return by the Murkhun or Karun Pir pass, which is the only summer road into the Shingshal valley. The season was also very late. The weather, which had hitherto been bright and fine, was changing, and clouds were gathering. The first fall of snow would, I knew, close the pass, and my work would be incomplete. So, rather reluctantly, I felt it my duty to turn back. Before doing so my men built a second cairn to show that no portion of the road from Shahidulla to Hunza remained untrodden by an Englishman.

We returned immediately to Dut, which we reached on the third day, and then, turning our backs on the Shingshal river, faced the Karun pass in front of us. We had forded the river seventy times in all, in water always icy cold, often frozen top and bottom, and in a depth varying from 18 inches to nearly 5 feet. We had had enough of it. The path up to the Karun pass ascends at a terribly severe gradient for 1500 feet, through clay and gravel cliffs, overhanging schistose rocks, clearly marking the limits of an ancient lake-bed, or perhaps a pamir. Here I deciphered an inscription written in Persian on the cliff, a couplet from Saadi, cursing the difficulties of the road. We camped at a place called Tsurkurt, where there was a spring 3000 feet above the river. Next day we crossed the Karun pass. There is no gap in the ridge, and the rock is weathered into dome-shaped mounds of schist. There were 3 feet of snow on the

north side, the height being a little over 16,000 feet. There was a little glacier below, descending to which the laden coolies had to exercise care. But the snow was hard and the slope steep, and so some of us enjoyed a glissade to the bottom. Halfway down a sharp turn was necessary to avoid a rock, and one of the men, losing his balance, did the rest of the journey head-foremost, ending, amid much laughter, in a snowdrift. After a weary stretch of 3 or 4 miles through soft snow we reached a smiling little alp called Pariar, where the stream flowed through grass meadows, and the Murkhun shepherds bring their flocks to graze in summer. To eyes grown weary of the barren cliffs and gorges of Shingshal it seemed lovelier than it doubtless is. From there to the Hunza river at Murkhun the descent grows steeper and steeper, the last few miles through a very narrow gorge.

As the weather had cleared, I now decided to attempt to explore the Khunjerab valley leading to Sarikol. I took with me on this occasion a larger tent, and a table and chair, having found by experience in the Shingshal that there is nothing more trying to the temper, after a long and dreary trudge, than sprawling on one's bed while writing up a diary and making a map. Indeed, when the ink in the stand is frozen and every nibful has to be thawed in the flame of the candle, the work becomes interminable. I need not speak of the route up the Hunza river; its terrible gorges have often been described. We soon turned up the Khunjerab river, and the laden coolies followed a difficult footpath up the right bank. Being mounted I kept to the river-bed and forded the stream a dozen times or more. Even in November I found the fords none too easy; in places the water was over my saddle. Just below the confluence of the streams from the Kilik and Khunjerab passes, the river flows in a true gorge, very narrow but not very deep. Then to avoid this gorge the path crosses the Luwarchivech spur. We marched for two days up the Khunjerab valley, which rises at a very steep gradient. At Shachkatar, where I camped, the river cuts through a mountain wall and flows in a true gorge, the cliffs rising sheer to a vast height. They were "alive" that night, and times without number I was awakened by the din of falling rocks, which at first I mistook for peals of thunder. In the morning we had a chase after a little animal which appeared to have its home among the loose rocks at the foot of the cliffs. I thought at first it was a leveret, but think now that it was what I have since seen described as a "mouse-hare." It had large round eyes, a small round body with ample mouse-coloured fur, and it dodged very actively in and out among the freshly fallen rock débris.

At Wadakhun, where we camped the following night, the Khunjerab valley runs east and west. To the north the hills recede in the form of a crescent. Girt round by this half circle of hills lies an elevated alluvial plateau through which the river has threshed its way to a depth of more than

1000 feet. About a mile to the east is the confluence of the Ghujerab from the south-east. This river drains a valley which is much broader and more extensive than the valley of the Khunjerab above the confluence. Its volume of water is far greater than that of the Khunjerab, and since the Khunjerab is a larger stream than that which flows down from the Kilik it follows that at the head of the Ghujerab valley, somewhere near the Shingshal pass, lies the true source of the eastern branch of the Hunza river. During the night we spent at Wada Khun heavy snow fell, and in the morning the ground was thickly covered. At the request of the coolies I stored the greater part of my baggage in my tent, which I left standing, and proceeded on the way to the Khunjerab encumbered with as little baggage as possible. Our route lay over easy slopes, gradually ascending for about 2 miles across the eastern horn of the crescent already described. It terminated to our right in a low flat-topped knoll, beyond which the cliffs fell precipitously to the river 2000 feet below. In front of us the track crossed the spur and then plunged, at an appalling gradient, down a rocky gully and out of sight. From the spur we could trace the course of the valley for miles, and below us, like a silver thread, we could see the stream winding through narrow strips of jungle, now hidden by a projecting cliff, reappearing again straight below us, and finally vanishing in the deep gorge to the right.

This pass, called Titirrip, approximately 12,350 feet high, is held by the Guhjalis to mark the boundary. In winter one cannot get horses across the pass, or even laden men, as I soon found. In summer you cannot get them beyond the pass owing to the depth of the water in the river. On the other hand, the higher valley is easily accessible from Sarikol, and in places there are traces of Kirghiz colonization. In fact, the water-parting between the Indus and Tarim basins is not always locally accepted as the boundary. The Shingshal people regard the whole of the Shingshal Pamir as far as Darband as belonging to them, and assert their right by grazing their cattle on it. I found afterwards that the Indus–Oxus watershed is not regarded as the boundary either. Thus the Ishkumman people use the grazing grounds beyond the Khora Bohrt as far as Ab-i-Wakhan. On the other hand, the Wakhis claim and use the splendid pastures of the Upper Yarkhun valley.

When we reached the Titirrip pass we found the descent impossible. I had stayed behind on the pass to do a little plane-tabling, and, hearing considerable commotion below me, hurried down the slope to overtake the coolies. The path was at first easy, but where it became steeper I found them all huddled together, none of them anxious to follow the hasty lead of one who had slipped and fallen, but by good fortune had been brought up suddenly on the very edge of the precipice. Their leather foot-gear could get no grip on the icy slope, and after several had had very severe falls it became obvious that I must cut steps for them. There were no ice-axes; nothing, in fact, except my alpenstock and the

heel of my heavy boots. I, however, went in front. So long as the ground was not rocky I had little difficulty in cutting steps which were at least sufficient for my own wants. But by this time the coolies had lost their heads and the younger men were in tears. Nearly every one expected me to help him, and I had to help with the loads as well. When we reached the ice-covered rock surfaces, the difficulties increased. Progress was painfully slow, and after an hour's toil it became obvious that we should never reach the bottom of the slope before nightfall. The path had become really dangerous, and it seemed likely at any moment that a coolie would fall and break his neck. I therefore decided to return and to put off the further exploration of the Khunjerab valley till the spring. When, five months later, I revisited the place and viewed the whole descent from top to bottom, I saw no reason to regret this decision. Snow fell all that day and all the next. No survey work could be done, and the ill-clad and ill-shod coolies suffered severely.

I therefore returned to Hunza. The route down the river is well known. The Hunza river makes a big bend through a deep gorge at Khaibar at a level of about 8500 feet, between two peaks 4 miles apart, both about 18,000 feet high. This may be the real axis of the northern Karakoram range.

I started north again five months later. Experience taught me to replace my local coolies by carriers from Baltistan. These men I equipped as well as I was able, and they remained with me for two months and did extremely well. During the winter, too, thanks to our President, my stock of surveying instruments had been largely augmented. Besides my cavalry sketching-board and an aneroid, which were all I had in Shingshal, I now had a 3-inch mountain theodolite, a 6-inch sextant, a subtense instrument with a 10-foot rod, and two hypsometers. Colonel Woodthorpe had used the subtense instrument with Lockhart's mission of 1885–1886. He generally worked the traverse himself, and entrusted the plane-tabling to a native surveyor. To the latter he gave the bearings and distances obtained, and in this way they did as much as 19 miles of a good route traverse in one day. On the other hand I had no one to help me, and I had no tables by which to find the distances. I had to calculate each distance from formulæ. I then plotted them on a large scale and reduced them, replotting them on the plane-table, and then worked in the topography. In the Khunjerab the gorges are so narrow and so tortuous that I had to observe at very frequent intervals. I took the mean of three to five observations of each distance, and all this consumed a vast amount of time. Working ten and eleven hours a day I never did more than 12½ miles, and averaged not more than 8 or 9. So far as my work has been checked by the trigonometrical triangulation conducted up the Hunza valley, it appears to have been more accurate than I could have hoped. Occasionally I got a bearing to fixed peaks, which, with very careful observations for latitude, helped me greatly.

My party, beside the Balti coolies, my Hindustani cook, Abdulla, and myself, consisted of a Pathan orderly, another Hunza man to carry the 10-foot rod, and a guide. We reached the Titirrip pass again on April 26 The descent was at first easy, but presently the path plunged abruptly down a rocky gully for some 1200 feet, and then down broken detritus slopes steeply to the river-bed. The total descent proved to be 1950 feet in 1300 yards, or exactly 1 in 2. Beyond this pass the path lies in a gorge. At Dih a considerable tributary flows in from the north-west, a fine open valley wooded with willow and a kind of poplar. It is a favourite haunt of ibex, and the stream abounds with fish, which we found very excellent. A little above Dih the Karchenai gorge enters from the north, over which there are glacier paths to the Tagdumbash Pamir. The valley narrows again until Barakhun is reached, where the valley bifurcates, one stream coming from snowy peaks to the north-east and the other coming in from the south-east.

Up this lies the path to Khunjerab. It presents no difficulties, but about 4 miles from the pass it rises sharply, leaving the valley, where the stream can be seen rising in glaciers to the south-east, and crosses some very tiresome stony slopes until it emerges upon a broad upland. The descent on the Sarikol side appeared equally gentle and easy, but a range of mountains almost parallel to the range on which we stood quickly closes the view to the east. As we turned back the snow began to fall and continued throughout the day.

During the next month I visited the Mintaka and Kilik passes. They are both well known and need no description from me. I may mention that the Hunza people call the Mintaka Kirisht. Mintaka means "many sheep," and Kirisht means "a sheepskin." I saw plenty of *Ovis poli* and some ibex with very fine heads, but had no luck with them; their womenfolk were too watchful. There were the tracks of a bear and of a wolf crossing the pass, apparently in company. Pigeon and hares were seen at the foot of the pass, and a red-breasted bird, about the size of a thrush, on the very summit.

South-west of the Kilik pass there is a fine snow peak which lies about 6 miles due south of the actual water-parting of the Oxus, Indus, and Tarim basins. I observe that, in the Indian Survey 4-inch map of Hunza published in 1915, the range on which this point is situated, and which is crossed by the Kilik, Mintaka, and Khunjerab passes, is called the Sarikol. If this is the last word in mountain nomenclature, I would suggest that the range crossed by the Irshad pass, and forming the water-parting between the Oxus and Hunza rivers, should be regarded as part of the Hindu Kush.

My next work was to visit the Irshad pass. Leaving the Kilik valley I entered the Derdih valley, and thence crossing the Kermin pass (13,050 feet) dropped down into the Chapursan valley. No Englishman had

followed this route, though Colonel Grombchevski entered Hunza by it in 1888. The Derdih valley is far more extensive than had been previously shown on any map. The Chapursan valley had not been seen or mapped west of the Kermin pass. But since my time it has been crossed by Sir Aurel Stein, and I believe he has described it here. The bed of the valley must once have had the character of a pamir, and, if I am not mistaken, there are traces of alluvium on both banks at very high levels.

At its head lies the difficult Chillinji pass, by which the Karumbar valley can be reached. The actual point of crossing seems to differ in different seasons. The natives truss themselves with long poles, one under each arm, and one over the back and chest, and so trussed laugh at the crevasses. The Mir of Hunza told me that he once crossed the pass without ropes or any of the usual precautions. "How did you do it?" I asked him. "It was very simple," he said; "I put a man in front, and, where he did not fall in, I followed." More than one life has been lost on this road, which only saves one march and is seldom used. It is a curious characteristic of the lateral valleys which join the upper Chapursan valley that they descend gently until they overlook the main valley, and then fall very abruptly to the lower level. It is as if they had lost their way and had come out 1000 feet higher than they had intended. The main valley seems to have eroded very much more rapidly than its tributaries.

The Irshad pass, or rather passes, for there are two of them, lie at the head of a side valley about 6 miles long which joins the Chapursan river at Beskiyenj opposite a great glacier that comes in from the south. I had a horrible time getting to the pass, as there were 3 feet of snow frozen on the top but not hard enough to bear my weight. The hillsides had been swept by occasional avalanches, which we welcomed, as they cleared the snow for us. We found 3 feet of soft snow very tiring at an elevation of 16,000 feet, and took turns in leading. Eventually we cut through the overhanging cornice and reached the summit. From the pass one looks down a narrow rock-bound valley which can be traced for some 10 miles as far as Lupsuk, where the Khora Bohrt pass joins in. Facing the south-east one gets a magnificent view of the peaks, nearly 23,000 feet in height, which separate the higher snowfields of the Batur glacier from those of another glacier which trends west. These glaciers have never been explored, but I believe that that visible from the Irshad pass is the main source of the Bar glacier which drains into the Hunza river near Chalt.

Returning from Irshad I saw a magnificent avalanche fall into the valley behind us, taking its start from a very lofty peak on our right and falling right across the path which we had just traversed. This was the only one I saw or heard, but the route is reputed to be very dangerous owing to avalanches.

In returning to Hunza I crossed the great Batura glacier, which we

MALUNGI DIAS AND MALUNGUTTI GLACIER

TITIRRIP KOTAL, KHUNJERAB

LOOKING S.E. FROM GHARAJAR, VERIJERAB GLACIER

found fairly easy and practicable for laden animals. I also crossed the Sasaini glacier. Whether we missed the right track I cannot say, but we were suddenly confronted by a series of profound crevasses, the ice being heaped up and contorted into the most extraordinary forms. It was no easy matter, in a gale of wind, to clamber along knife-like ice-ridges over yawning chasms. It took us an hour to reach the very pretty village of Ghulkin. The next day I crossed the Baskuchi pass. It is an upper road, crossing a spur in order to avoid the gorge at the great elbow of the Hunza river. It is a horrible path, very steep to the top of a dry gully, and then an awful precipice, a sheer wall of rock down and across which a narrow cornice, scarcely more than 12 inches wide, has been bracketed to the face of the cliff with really marvellous skill. Two turns in the perilous gallery makes the passage hazardous for animals. The river-bed, though 2500 feet below, seems, as one stands on the cornice, to lie beneath one's feet. I could never have believed it possible to take a pony across it, had I not been told by the Mir of Hunza's brother that he brought his own across it not ten days before, and had I not seen the marks of hoofs along the track.

Towards the end of that year, 1893, I made many minor explorations of which I have no time to speak. Among others I explored the Daintar valley, at the head of which there is a V-shaped depression, filled with ice and heavily corniced. Lieut. (now Field-Marshal Sir William) Robertson, who had visited it, reported it to be impassable. I confess that I did not like the look of it myself, the rock wall at the end appearing very steep and formidable. When I asked my guides if they had ever crossed it they replied, "God forbid." But our President made light of it when he made up his mind one day to see where it led. I myself found a pass, which had not been crossed before, leading south over a spur which may prove to be a continuation of the Kailas range. It lies between the Daintar and Naltar valleys. The elevation of the pass is 15,210 feet, and there are glaciers on both sides. The rock dips almost vertically to the south, so that the top of the ridge scarcely affords room for a plane-table. Crossing into the Naltar valley I found myself in the most exquisite highland scenery.

Another time I had the pleasure of climbing a steep valley in Hunza, in the company of Charles Bruce, who is leading the expedition to Mount Everest, which we all hope will prove successful. We spent a night at the head of the valley, and from our camp looked right up the great Hispar glacier. Bruce cooked a wonderful dinner for us both, and the next morning gave me an ice-axe and a rope, and my first lesson in using them. I well remember being let down a steep rock face with one end of the rope about me and turning like a joint on a spit in a vain endeavour to get a foothold as I descended. When I reached the glacier Bruce threw me the rope and in half a minute stood beside me. How

he did it I do not know to this day. I may mention that I spent the whole of 1894 in exploring the Hindu Kush and the lateral valleys of Chitral. In the course of my work I discovered and crossed a score of glacier passes, but feared to use the rope, and my steps were not always very well cut. For example, there is a pass called Dir Gol which crosses a range just south of Tirich Mir. The pass is over 16,000 feet high. It is a fissure in a razor-like splintered ridge of porphyritic granite, which here forms the watershed. The descent lies down an almost perpendicular couloir, over rotten rocks, for 100 feet or more, and then for another 60 feet down a steep ice slope. As we crossed this, one of my amateurish ice-steps gave way beneath my Ghurka orderly, who, followed by my dog, went flying downwards. At the foot of the slope there yawned a great crevasse, but he struck it where it happened to be crossed by an ice-bridge, and swung right out on to the glacier.

As might be expected, earthquakes in this part of the world are frequent and severe. One perhaps deserves more particular mention. I was waiting for a missing pony, and was standing on a small stretch of level ground across which the path ran before entering a narrow gorge beyond. Suddenly I saw the steep mountain slopes on both sides of the gorge grow "alive" (as it is called), and huge masses of rock fell crashing into the valley, wholly obliterating the path, as I subsequently discovered. Great clouds of dust rose high into the air, and as I watched, astonished at the sight, from out of the gorge appeared as it were a succession of billows, like great Atlantic rollers after a storm. In another moment they were upon us; the earth heaved and rocked, and among men and animals all was temporary confusion. I remember it gave me a queer sensation such as one gets on a swing or an anchored boat. There were not, I think, more than a few waves, at most a dozen, and I could form no accurate estimate of their height from ridge to furrow.

Before leaving Hunza and Nagar I wished to see every village in Nagar, as well as Hunza, to complete my work. Crossing to Nagar, which is very prettily placed on a ridge beside a lake, I camped at Hupar, and reached Hispar the next day, crossing the Bapur glacier and the Rashtanni pass. The Hispar river is crossed twice by very frail bridges. Just above the Hispar village lies the snout of the Hispar glacier, which, as you all know, unites with the Biafo glacier to make the longest ice pass in the world outside the Arctic regions. The map of the Hispar–Shingshal watershed is still far from complete; indeed I doubt its accuracy. It is certain that about 6 miles above Hispar a great glacier, called Lak, joins the Hispar glacier from the north, but there is considerable doubt as to the proper position of Hispar. Surveyors with the Bullock-Workman Expedition place it 6 or 7 miles to the west of the position found by me (36° 9′ lat. N., 75° 4′ long. E.).

Sir Martin Conway places it between the two positions. I may state

that I surveyed the route between Nagar and Hispar in exactly the same manner as elsewhere, and I made Hispar 20 miles as the crow flies south-east of Nagar. The Mir of Hunza calls it 29 miles by the track, and my route traverse made it about the same. The Bullock-Workman surveyors experienced great difficulty in identifying the two survey peaks, Kanjut No. 1 (25,460 feet) and Kanjut No. 2 (24,580 feet), and throw doubts on Godwin-Austen's map work. But Godwin-Austen's work ends a little to the west of Nushik La. He mentions that his view north was obscured by the high ridge between the Haigatum and Hispar glaciers. This is undoubtedly the fact. A close comparison of Godwin-Austen's map with those of Sir Martin Conway and the Bullock-Workman surveyors (which differ a good deal in detail) convinces me that, so far as Godwin-Austen could see, he mapped this region with his usual care and accuracy. If the Workman surveyors were, as I think, 6 or 7 miles out in longitude, they would naturally experience difficulty in identifying the fixed peaks. Hunza peak No. 2 is clearly at the *head* of the Pumarikish glacier, and the Lak glacier lies to the west of it; but how far west should it be placed, and how far north does it go? Looking at the photographs taken by the Bullock-Workman surveyors, I seem to see in the shape of the mountain mass that closes the Lak glacier towards the north-east a very strong resemblance to the great double-headed peak, Malungi Dias, which I discovered and whose position I fixed in the Shingshal valley. That peak cannot be more than 12 miles from the trough of the Hispar glacier. Godwin-Austen stated that some of these glaciers seem to run back 10 or 12 miles, and in this part of the world a glacier of 12 miles in length can only be described as one of moderate size. I am inclined, therefore, to believe that Malungi Dias drains south-west into the Lak glacier, and is thus on the main Hispar–Shingshal watershed. Probably the head of the Malungutti glacier lies near the peak Kanjut No. 1 (25,460 feet).

The whole region north of the Hispar pass is of great interest. The head of the Shingshal valley is unsurveyed, as also is the head of the Ghujerab valley. South and south-east of the Shingshal there is a wide area which may contain high mountains still uncharted. In this direction, too, there is reputed to be a pass leading from a point east of the Shingshal pass up a tributary of the Oprang valley into Baltistan. I think the great Hispar glacier has proved too strong a lure to travellers in this part of the world. It has diverted attention from mountains and valleys in the vicinity that deserve to be more thoroughly explored. I shall feel deeply gratified if my lecture to-night induces some competent person to undertake an expedition to the north of the Hispar. I am convinced that there lies in that direction a field for exploration worthy of any traveller, however distinguished.

Before the paper the PRESIDENT said: I have great pleasure in introducing to you Brigadier-General Cockerill, who years ago was with General

Bruce and others here to-night serving on the Kashmir frontier, which is so well described in Mr. Knight's book 'Where Three Empires meet.' When the Russians were advancing towards our frontier, General Cockerill made most interesting journeys into that still relatively unknown country and discovered a very high mountain which apparently nobody has visited since, though its height has been fixed by the Survey of India from a distance. I will ask General Cockerill to give us his paper on these journeys.

General Cockerill then read the paper printed above, and a discussion followed.

Sir HENRY MCMAHON: I can add very little to what has already been said, but as you have asked me to speak I welcome the opportunity to pay my tribute of thanks to General Cockerill for the most delightful and interesting paper we have had from him this evening. It has been a great pleasure to me personally, for I was in civil charge of that country for some years, and these pictures have recalled many familiar scenes and faces. I was helped a very great deal in finding my way about the less-known portions of that country by the very able and valuable reports which General Cockerill had written and left behind. I would like to endorse what has been said by General Cockerill to-night, that more men ought to visit and work in this country and fill the many unexplored and unsurveyed portions that still remain. The beauty and grandeur of the scenery, and the friendliness and charm of the people who inhabit this remote corner of the Earth, will amply reward them for their efforts.

The PRESIDENT: I should like to see, as a result of this evening's paper and discussion, parties sent up to complete the work commenced thirty years ago and bring us back thoroughly good maps and still better photographs. It is a most wonderful region, and even if travellers cannot go out from England, I hope that officers will go from Gilgit and carry on General Cockerill's work of thirty years ago. I know you all wish me to thank General Cockerill for his interesting lecture this evening.

THE KLAGENFURT PLEBISCITE

Roland L'Estrange Bryce

Read at the Meeting of the Society 8 *May*, 1922.

I MUCH appreciate the honour which your Society has paid me in inviting me, as Secretary-General of the Klagenfurt Plebiscite Commission, to give you some account, under the heading of Political Geography, of one of the many "children" of the Peace Conference. This account I shall more or less strictly confine to a description of the organization and methods with which the Plebiscite was conducted. The geography of the plebiscite area is simple and does not call for any detailed description, and, as events shaped, the purely technical geography of the plebiscite, as distinct from its political side, is comparatively unimportant; but this might not at all have been the case had Zone 1 of the Plebiscite area voted for Yugoslavia and Zone 2 for Austria, which would in all probability have necessitated certain geographical adjustments of the Line of Demarcation between the two zones, to include the

Klagenfurt Electric Works in the same zone as that city and unite the town of Velden with its suburbs. Of course, indirectly, the influence of geographical position played a large part in the final result of the plebiscite, as I will show later.

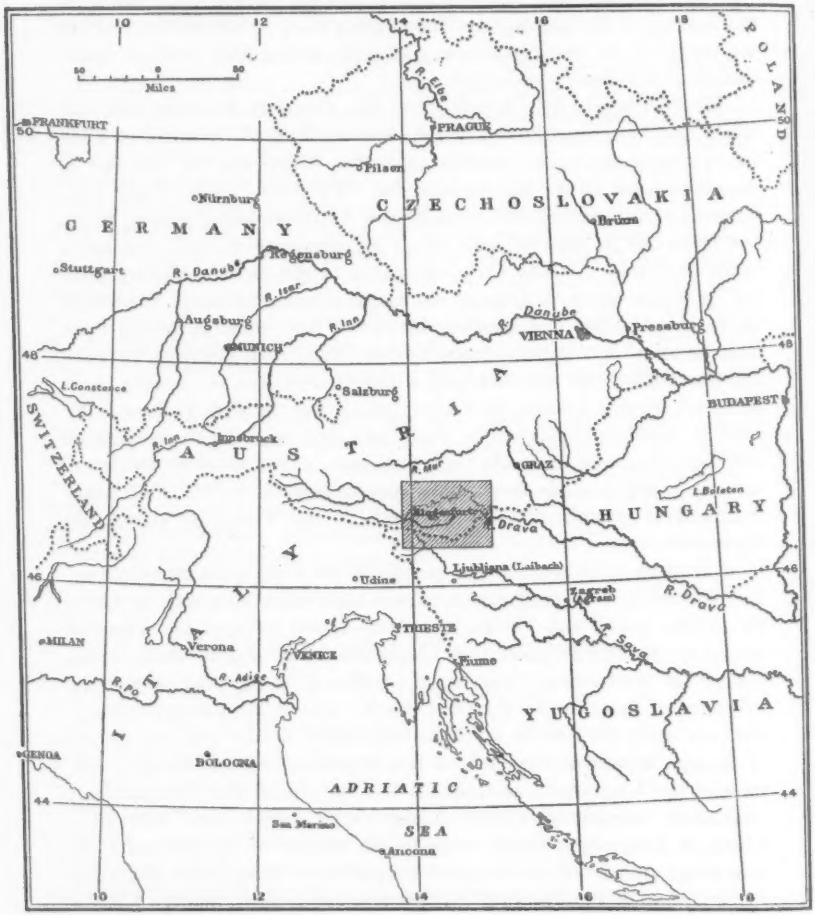
Nor shall I attempt to deal with the political events which led up to the holding of the plebiscite. They form a story by themselves, and are the perquisite of the diplomatic and political historian and of future diarists of the Peace Conference.

My story begins with Article 50 of the Treaty of Peace between the Allied and Associated Powers and Austria signed at St. Germain en Laye on 10 September 1919. Article 50 of that Treaty was the outcome of the intervention on 31 May 1919 of the "Big Four" at the Peace Conference in the armed quarrel between the Austrians and Slovenes, which had continued at intervals ever since the Armistice of 1918, and which in the third week of May 1919 culminated in the capture of Klagenfurt with immense stores of Austrian war material by the Slovenes, reinforced by troops of Serbia and Croatia, who since November 1918 had been their partners in the Serb–Croat–Slovene State. An armistice between the two combatants was arranged, a line of demarcation between them being set up, and towards the end of June it was decided by the Conference to divide the Klagenfurt Basin into two zones for the purpose of holding a plebiscite to decide their final fate. This solution, which was communicated to both combatants, was embodied in the draft treaty delivered to Austria on July 20, and in the Treaty as signed on September 10.

Nor can I enter here into the genesis of the larger political questions, complicated by vital problems of railway communications, such as that of the Asling tunnel and "triangle," which helped to focus the attention of the Great Powers upon the Klagenfurt basin and to make it the cockpit of contending diplomacies. Suffice it to say that it was the existence of these larger questions which made it absolutely necessary, not only in the interests of the local inhabitants, but in those of the rest of Europe, that there should be a fair, impartial, and satisfactory plebiscite in the Klagenfurt basin, though the basin itself was comparatively small and unimportant. Very serious results might have followed a failure at Klagenfurt, which owing to the success of the plebiscite has now relapsed into oblivion so far as the politics of Europe are concerned.

Article 50 of the Treaty of St. Germain laid it down that the Klagenfurt Area should be placed under the control of a Commission entrusted with the duty of preparing a plebiscite in that Area and assuring the impartial administration thereof. The Treaty also stipulated that in the first zone, which was to be administered in accordance with the general legislation of the Serb–Croat–Slovene (Yugoslav) State and by their officials, the plebiscite was to be held within three months of the coming into force of the Treaty, on a day to be fixed by the Commission,

and that, if the vote in that zone was in favour of the Serb–Croat–Slovene State, a plebiscite was to be held in the second zone within three weeks of the proclamation of the result of the plebiscite in the first zone, on a date to be fixed by the Commission. If, however, the vote in the first



Sketch-map of the Klagenfurt Area and the surrounding countries.

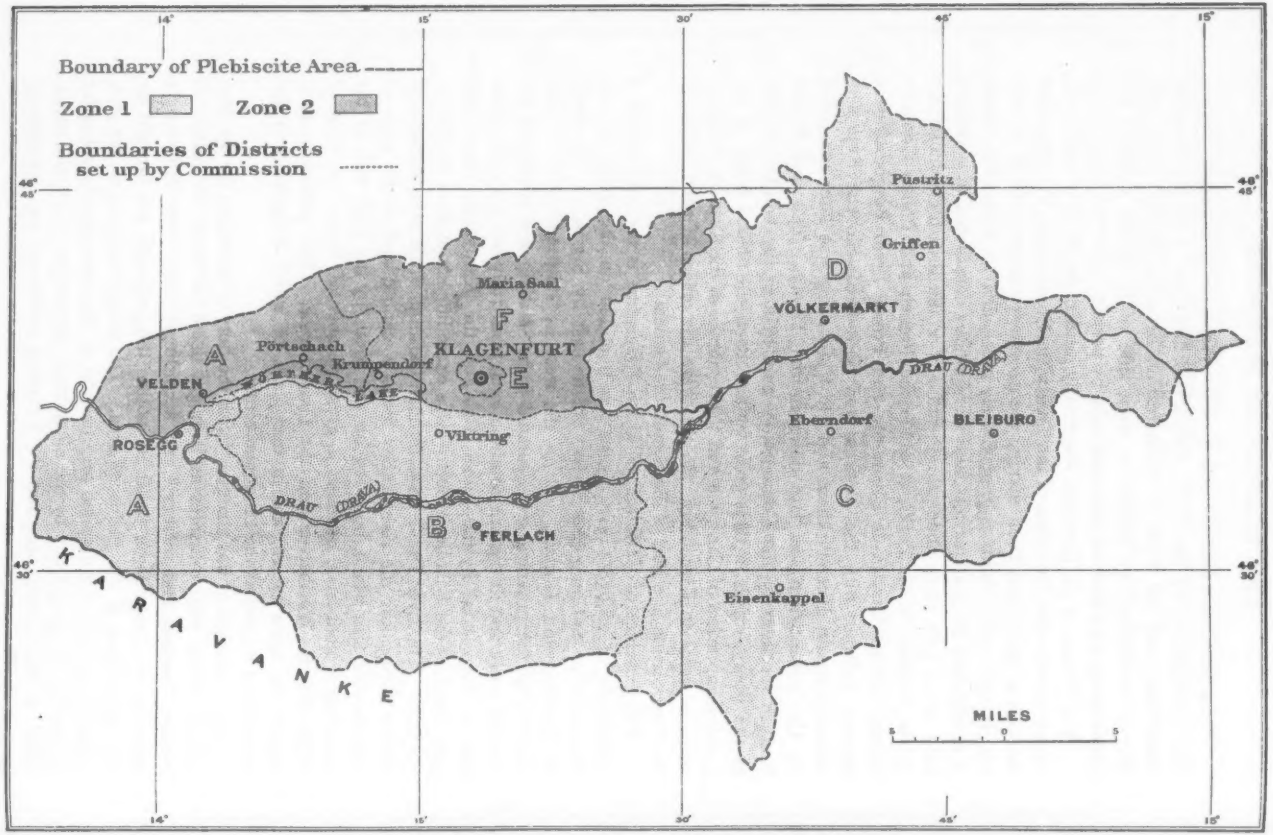
zone resulted in favour of Austria, no plebiscite was to be held in the second zone, which was to be administered in accordance with the general regulations of the Austrian legislature and by Austrian officials, and the whole of the plebiscite area was to remain definitely under Austrian sovereignty.

From June 1919 until the arrival of the Plebiscite Commission Zone 1 was administered by the S.C.S. authorities, and Zone 2 by the Austrian authorities, and the Line of Demarcation between the two zones was strictly maintained by guards on each side of it, transit between the zones being very limited, and then only by permit.

The Treaty of St. Germain was finally ratified on 16 July 1920, and, in accordance with the terms of the Treaty, the Commission, the respective sections of which had been making the necessary preparations as to staff, etc., in their own countries, immediately proceeded to Klagenfurt, where it established its headquarters, and was formally constituted at a meeting held on 21 July 1920, under the Presidency of the British Commissioner (Lieut.-Colonel S. C. Peck), at which the French and Italian Commissioners (Count Charles de Chambrun and Prince Livio Borghese) were present, together with the Austrian and Serb–Croat–Slovene Representatives (Captain Peter-Pirkham and Dr. Cvijić, who was later succeeded by Dr. Yovanovitch), as laid down in the Treaty. This and further Council meetings of the Commission were held in the building known as the Bourg, which in days gone by had been the official home of the Landeshauptmann of Carinthia and the residence of the Austrian Emperor when he came to Klagenfurt. In this were the offices of each section of the Commission and that of the Secretariat-General.

The Province of Carinthia, of which Klagenfurt is the capital with a population of 28,958 (1910 census), is bounded on the north by the Provinces of Salzburg and Styria, on the east by Styria, on the south by Carniola and Gorizia, and on the west by Italy and Tirol. The frontiers of the province are separated from Salzburg and Styria by the Tauern range and its eastern continuations, from Italy and Carniola (now part of Yugoslavia) by the Julian Alps and the Karavanke range, and from Tirol by the Schober group of Alps extending south from the Grossglockner. The river Drave flows through Carinthia from west to east, and around Klagenfurt the river valley forms a central and fertile plain of considerable size which, bounded on the south by the high wall of the Karavanke mountains, contains a great number of lakes, the chief of which are the Worthersee and the Ossiachersee. The plebiscite area, roughly 60 miles by 20, was in this plain, of which Klagenfurt is the geometrical as well as the economic centre.

The Commission was charged "with the duty of arranging for the vote and of taking such measures as it might deem necessary to ensure its freedom, fairness, and secrecy," and accordingly steps were immediately taken by the Commission to set in motion the proposals put forward for the organization of the plebiscite area. The underlying idea of the plan adopted was that the detailed organization of the plebiscite should as far as possible be carried out by the inhabitants themselves under the supervision of the Commission, and the following machinery was accordingly set up:



Zones and District Boundaries of the Klagenfurt Area.

(*a*) An Inter-Allied Secretariat.
(*b*) An Advisory Administrative Council.
(*c*) District Councils.
(*d*) Commune Councils.

The Inter-Allied Secretariat consisted of a Secretary-General (British) and three Secretaries, one British, one French, and one Italian, and to it were assigned the duties of compiling the minutes of the meetings of the Commission and conducting the business of the Inter-Allied Section.

The Advisory Administrative Council consisted of three members, one British (Chairman), one French, and one Italian, to whom were entrusted the duties of supervising and reporting to the Commission on the administration and government of the two zones of the area, and in particular of ensuring that no public official or employee used his position or office to influence the voting in any way whatsoever.

The plebiscite area was for the purposes of the Commission divided into six districts, in each of which were placed District Councils consisting of District Commissioners (Inter-Allied military officers), one nominated by each of the British, French, and Italian Commissioners. These District Councils acted as corporate bodies, the Chairmen (representing equally the three nationalities) signing their reports and forwarding them to the Commission on behalf of their colleagues; they were made responsible to the Plebiscite Commission for all the details of organization of the plebiscite within the confines of their districts, forming the channel by which the orders of the Plebiscite Commission were conveyed to the Commune Councils, and being responsible for seeing that these orders were carried out. They were also charged with the supervision of the administration of their districts.

The Commune Councils, of which in Zone One of the plebiscite area there were in all fifty-one, consisted of six representatives, three being nominated by the Austrian Representative on the Commission, and three by the Serb–Croat–Slovene Representative. These Councils were made responsible to the District Councils, whose duty it was to keep in close touch with and supervise the work of the Commune Councils, to compile the register of voters in each district, and to preside at the polling centres on the day of the vote. The Chairman and Secretaries of each Commune Council, who represented in each case the Austrian and Serb–Croat–Slovene parties or *vice versâ* in equal proportions, were appointed by the District Councils, who were instructed that wherever possible members of Commune Councils should be local men belonging to the commune in which they served, and in most cases local men were obtained.

In addition to the above organization there was set up an Inter-Allied Tribunal consisting of one British (Chairman), one French, and one Italian representative and two assessors in a consultative capacity nominated by the Austrian and S.C.S. representatives respectively. The duties of this Tribunal were to try offences against the authority of the

Zones and District Boundaries of the Klagenfurt Area.

Commission, such as disobedience to their instructions and proclamations, wilful hindrance of officials carrying out duties in connection with the plebiscite, impersonation at the polling booths, deliberate falsification of ballot papers, etc. As events turned out, it was never found necessary to bring a case before this tribunal, which consequently never sat.

A Boundary Committee composed of a British, French, and Italian officer, together with an Austrian and S.C.S. representative, was also set up in order to determine in detail on the spot the geographical boundaries of the area as defined by the Treaty of St. Germain. This Committee accomplished their work expeditiously, very little real difficulty being experienced in fixing the boundaries on the ground. In nearly every case the Committee were unanimous, and such rare cases of disagreement as there were were referred to the Commission and settled by it.

As soon as the District Councils had established the Commune Councils and put them in motion, the Commission issued detailed regulations designed to govern the preparation of the registers and the carrying out of the vote in all its stages. These regulations, which were printed in the German and Slovene languages, set forth in full the conditions governing the right to vote, the method of compiling the registers, the rules governing appeals and objections, the procedure on the day of voting, the form and use of the ballot papers, and finally the method employed in counting the votes. By the terms of the Treaty of St. Germain the right of voting in the plebiscite was enjoyed by every person of either sex:

(1) Who on or before the 1 January 1919 had attained the age of twenty years, and

(2) Who had on 1 January 1919 his or her habitual residence in the zone subjected to the plebiscite, and

(3) Who either (*a*) was born in the said zone or (*b*) though not born in the said zone had his or her habitual residence or enjoyed rights of citizenship in the said zone from a date anterior to 1 January 1912.

In order therefore to qualify for a vote every one had to satisfy the first two conditions, and one or other of the alternatives under the third condition. If a person satisfied the conditions in respect of age and of place of birth, it was necessary that he or she should also have had his or her habitual residence in the zone of plebiscite on 1 January 1919. If a person qualified in respect of age but not of place of birth, then he or she must also have had his or her habitual residence or have enjoyed pertinenza in the zone of plebiscite on 1 January 1919 and for a period of not less than seven years preceding that date, *i.e.* from a date anterior to 1 January 1912. The word "zone" in sub-headings (*b*) and (*c*) of Clause 50 of the Treaty of St. Germain was interpreted by the Commission in its wide sense as meaning the whole zone of plebiscite. Also a person was said to have "habitual residence" who on or before 1 January 1919 had settled in the plebiscite area with the obvious intention or with

intent appearing from circumstances to take there his permanent residence. "Habitual residence" for the purposes of the Commission's rules was not considered as being interrupted by absence if the circumstances showed the intent to retain the residence, nor owing to the liability to render military service or as a consequence of the war. Imprisoned persons, but not certified lunatics, were allowed to vote. The former were very few in number.

Before passing to the actual voting arrangements, it is fitting to give some account of the administrative action which it was necessary for the Commission to take in order to ensure the impartiality of the plebiscite. In this connection it should be pointed out that the Austrian and S.C.S. Representatives on the Council of the Commission, while they were allowed free expression of their opinions on all matters under discussion appertaining to both zones, did not possess the right to vote, which rested only with three members of the Commission, namely, the President and the Italian and French Commissioners, and that these Austrian and S.C.S. Representatives had, at the request of the Commission, been duly vested by their respective Governments with the necessary authority and power to take action on any matter and to carry out the Commission's instructions without prior reference to their Governments. Owing to the nationality of the President, English was spoken at the Council meetings, and was the official language in which all the business of the Commission was carried out. The proclamations embodying regulations, etc., which the Commission addressed from time to time to the inhabitants of the area were drawn up in two languages, German and Slovene.

The most important administrative problem which faced the Commission on its arrival was the question of the line of demarcation between the two zones. It had been obvious from the very first that the abolition of this line was absolutely essential to the carrying out of a fair and free vote, and the Commission at once decided that, as the instructions of the Ambassadors' Conference in Paris to this effect had not been complied with by the S.C.S. authorities before the Commission's arrival, this must be done before the work of organizing the plebiscite could be proceeded with. After considerable difficulty, enhanced by the fact that, unlike other Plebiscite Commissions under the Treaties, the Klagenfurt Commission had no Inter-Allied troops of their own and were not themselves actually administering the area as were the Upper Silesian Commission, but only supervising it, the complete abolition of the Line of Demarcation was accomplished, the Austrian and Yugoslav soldiers, police, and finance guards were removed from it, and transit between the two zones became free and unrestricted to all persons and goods coming from either zone.

To allay fears that by the abolition of this line the two zones would become the prey of unauthorized persons and propaganda from without the plebiscite area, cards of identity were issued to all residents inside

the plebiscite area and a cordon drawn round the area into which no outside resident was allowed to enter without the visa of the country whose subject he was.

The next thorny question to be dealt with was that of the removal of the Yugoslav troops which the Commission found stationed in Zone 1, in addition to a force of gendarmerie, whereas in Zone 2 there were no troops but only a force of Austrian gendarmerie, together with a police force in the town of Klagenfurt. The Commission succeeded in obtaining the withdrawal of these Yugoslav troops from Zone 1, and, in accordance with the terms of Article 50 of the Treaty of St. Germain, replaced them with a police force "recruited on the spot" and controlled by Inter-Allied officers appointed by the Commission. In order to effect the establishment by the Commission of its own police force, which applied equally to both zones, it was necessary to eject from the existing gendarmerie forces, Austrian and Yugoslav respectively, all members thereof who were not natives of the plebiscite area, and to fill the resulting vacancies by natives of the area. Such officers of the existing gendarmerie who were natives of the area were retained, but had in future to carry out their duties under the supervision of a Controller of Gendarmerie, who was an important member of the Commission, and who had to assist him three Inter-Allied military officers, two for Zone 1 and one for Zone 2. This force on the whole proved satisfactory, and the Zone 1 section of it, which was the only one really called upon to prove its worth, did its work impartially and conscientiously on the polling day, thereby contributing greatly to the quietness with which that day passed off.

After almost a superhuman effort, which was necessary owing to the shortness of the time, three months, allowed under the Treaty for taking the vote, the voting lists were duly drawn up by the Commune Councils, doubtful cases being submitted to the District Councils; were publicly exhibited for a week so that objections on the score of either omission or wrong inclusion could be made by any one to the Commune Councils for submission with their views to the District Councils; and were finally revised by the District Councils within the dates prescribed by the Commission. The voting took place in Zone 1 on Sunday 10 October 1920. No untoward incidents marred the day, in spite of the vast bands of partisans of both sides who swarmed into the zone overnight, but who, although armed with bludgeons and knuckle-dusters of all kinds, were too evenly matched and frightened of each other to do any harm; and the smooth working of the voting arrangements was greatly due to the harmonious collaboration of the Austrian and S.C.S. Representatives on the Commune Councils in carrying out the regulations of the Commission.

Polling centres were established in every Commune of each district of Zone 1, and in some cases there were two or more polling centres in one Commune, namely in Communes having more than 588 voters, each

UNTERDRAUBURG

THE VILLAGE OF EBERSTEIN

BLED

A CORNER OF KLAGENFURT

THE CHURCH AT MARIA SAAL

complete register containing 588 names, and there was approximately a polling centre to each register. The total number of polling centres was 80, and at each of these polling centres the polling commenced at 7 a.m. and closed at 6 p.m. The Inter-Allied Military Commission of Control in Vienna lent 58 Inter-Allied officers to the Commission for service on the polling day, and one of these was placed in charge of the polling centre in each of the Communes, the remainder being stationed on all the important entrances to the zone of plebiscite in order to keep out persons who had not the right to vote.

The voting was very brisk from the start, and, contrary to expectation, in most Communes practically all the voters had voted by midday. The voting was very orderly and there was very little unnecessary delay, as the majority of the voters came to the polling centres provided with their voting tickets and were so conversant with the procedure to be followed that the average time taken by each voter to record his vote was calculated in one large polling centre to be 36 seconds, and in some centres was less. On entering the polling centre of their Commune each voter was, after presenting his voting ticket and having his name and number as given on the ticket verified with the corresponding entry in the voting list, handed by the Chairman of the Commune Council an envelope, together with a green ballot paper bearing the word "Austria" and a white ballot paper bearing the word "Yugoslavia" printed clearly thereon in both scripts, and then proceeded into the small booth, of which there were several in each polling centre, where he or she tore into two pieces the ballot paper of the State for which they did not want to vote, and inserted both the torn and untorn ballot papers in the envelope, which was then closed and handed to the Chairman, who immediately placed it unopened in the ballot box in full view of all present. This method of voting, which was rendered necessary owing to the presence of a number of illiterates on the voting lists, gave great confidence to the voters, who realized that the conditions under which they voted ensured absolute secrecy, and was thus a large factor in the maintenance of peace and order, which was also contributed to by the prohibition of the sale of intoxicating liquors on the day of the poll and on the previous day.

Owing to the fact that all but a few stragglers had voted early in the day there was, as had been feared, no rush of people waiting to vote at 6 p.m., and in all places it was possible to close the poll punctually at that hour. The ballot-boxes were then sealed by the Commune Councils and together with the accompanying protocols were taken charge of by the Inter-Allied officer on duty in each Commune and handed over to the District Councils, who collected all the boxes at their headquarters and placed a guard over them. None of the District Councils were able until the early hours of Monday morning, October 11, to commence the scrutiny, which was conducted in the presence of the Austrian and S.C.S.

liaison officers, who had for the last six weeks or so of the plebiscite been attached, together with a German and Slovene interpreter, to each district. Owing to the high percentage of voters the scrutiny in each district took much longer than was anticipated, and it was not until the evening of Wednesday, October 13, that the Inter-Allied Advisory Council, who had been charged by the Commission with checking and compiling the figures submitted by the District Councils, presented to the Commission the final result, which was announced by the President at a meeting of the Commission held that same night.

The plebiscite resulted in 22,025 votes being given to the Republic of Austria and 15,279 given to the Kingdom of the Serbs, Croats and Slovenes, leaving a majority in favour of the Austrian Republic of 6746 votes. A remarkable factor about the vote was the enormous percentage of the registered voters who throughout the whole zone recorded their votes. The total number of persons qualified to vote in Zone 1 was 39,291, and the total number of votes cast, including invalid votes, of which there were altogether 332, was 37,636, making a percentage of 95·78 voters who went to the poll. As the vote in the first zone was in favour of Austria no plebiscite was, in accordance with Article 50 of the Treaty of St. Germain, to be held in the second zone of the area, and the whole of the area was therefore to remain definitively under Austrian Sovereignty.

Under the Treaty, however, the labours of the Commission were not concluded until the administration of the whole of the Klagenfurt area by the Republic of Austria had been assured, and steps were accordingly taken by the Commission to make the necessary provisions for safeguarding the minority as far as possible and for handing over the machinery of government, such as civil and police administration, together with all the archives, public buildings, schools, and railway buildings and stock, to officials of the Austrian Government.

The work of the Commission in this direction was considerably delayed by the action of the S.C.S. Government in occupying Zone 1 with their troops on October 14, *i.e.* four days after the plebiscite. The Commission immediately protested against this action, and decided to take into their own hands the administration of Zone 1. The attitude of the Commission was supported by the Conference of Ambassadors in Paris, and the troops were consequently withdrawn after an occupation of the zone lasting about a week. The Commission were then able to proceed with the work of handing over, which had thus been interrupted, but it was not until November 18 that the Commission felt that the work had been thoroughly completed, and that they were in a position to entrust the whole zone to the care of the Republic of Austria. On that day the Commission published a final proclamation to the inhabitants of the area, informing them that their mission had terminated and that "henceforth the administration of both zones of the plebiscite area devolved in full measure upon

the lawfully constituted authorities of the Austrian Republic," and laying stress on the provisions of the Treaty of St. Germain respecting the protection of minorities. On that day also the final meeting of the Commission was held at which the President, the French and Italian Commissioners, and the Austrian and S.C.S. Representatives put their signature to a document delivering over from that day the administration of the whole Klagenfurt area to the Government of the Republic of Austria.

In the circumstances it was most satisfactory for the Commission to feel on their departure from Klagenfurt on November 20 that, after all the anxiety of the preceding months, the result of their labours left comparatively little rancour in its trail, and that there was every prospect that, given time and wisdom on the part of the Austrian authorities, the Klagenfurt area would settle down to an era of peace and happiness after the storms of the previous years. This prospect seems to have become more or less of a reality, and, so far as one has heard, there seems to have been but little trouble in the Klagenfurt area since the departure of the Commission. This satisfactory state of things is largely due to the fact that the inhabitants of the area had from the commencement given their approval and support to the arrangements for the taking of the vote, which they clearly understood and felt were based on sound principles adapted to the special needs and character of the area. Moreover, they realized that the actual voting had been carried out with scrupulous fairness and impartiality, and that the number of votes cast was so high and the size of the majority so convincing that they could but accept the result as final.

However one may explain the reasons why the vote went in favour of Austria, there is not the slightest doubt that it represented the true feelings of the inhabitants at the time. While it is impossible to analyze thoroughly the motives which prompted the majority of the peasant inhabitants to vote as they did, as is evidenced by the fact that even on the evening of the polling day both sides were equally convinced that they had won, there is little doubt that the economic and geographical factor played the largest part in the Austrian victory, and this in spite of the ethnographical preponderance of the Slovenes, specially south of the Drave. Roughly speaking sixty to seventy per cent. of the voters in Zone 1 were Slovene by race, and, though the extensive and systematic Germanization of these Slovenes, which had been going on for many years, was undoubtedly responsible for a good many votes for Austria, there still remained a large number of Slovenes who were influenced solely by local, economic, and geographical reasons. Whereas the slogan of an "undivided Carinthia" may have made a sentimental appeal to a few, it appears unlikely that a desire for a reunion with Austria as a whole won more than a few votes, except perhaps—and this appears to have influenced a certain number—on the selfish grounds that military service,

of which the inhabitants in those countries were weary, would be compulsory if Yugoslavia were successful, and that this would not be the case under the Republic of Austria. The factor however that did sway a very great number of the inhabitants was the question of the future markets for their produce. In the event of Zone 1 voting in favour of Yugoslavia they envisaged that, as it was most unlikely that Zone 2, containing the market and railway centre of Klagenfurt, would also vote for Yugoslavia, their only market and economic outlet would be cut off from them, and that they would have to depend for a centre upon Liubliana (Laibach), 60 miles away across the Karavanke mountains. Posterity and history alone can tell whether the choice of the inhabitants was in all the circumstances a wise one, and to them it must be left to judge of this, the only plebiscite hitherto conducted successfully without the aid of Inter-Allied military forces, and the only one in which moral authority and prestige were the sole weapons.

Before the paper the PRESIDENT said: I have great pleasure in introducing to you the lecturer this evening, Mr. Roland Bryce, who is a nephew of our late very distinguished Honorary Member, Viscount Bryce. Mr. Bryce has been on political duty in Central Europe since the war, and will give us an account of an interesting piece of political geography: the conduct of a Plebiscite.

Mr. Ronald Bryce then read the paper printed above.

The PRESIDENT: There are several very distinguished ex-diplomatists present, but they are generally averse to speaking on professional subjects in public. There is also a member of the Foreign Office here, but he is in office and knows too much. I fear, then, that our usual discussion is impossible to-night. It is interesting to have this account of how the political geography of Europe has been re-fashioned, and to see how extremely complicated the operation is. The problems are so delicate that there is obvious disadvantage in talking about them too much in public. In this case all seems to have gone smoothly; not on account of the use of force, for the lecturer has described it as being due to moral influence. I should, however, be inclined to say that a sense of humour had a great deal to do with it; it evidently smoothed over many of the difficulties, and I have no doubt introduced a good tone into the proceedings. We see in this instance how the many different factors were at work together. Apparently if the vote had gone on one factor alone, the ethnographic, there would have been a majority in favour of Yugoslavia; but other considerations came in, geography and economics, and as a result there was a very definite majority in favour of Austria. All the same, there is a considerable Yugoslav minority left, and I should say that we can really judge of the success of this operation only when we see how the administration of the area is carried out in future by the Austrian Government. If the minority is treated harshly, we know from experience the trouble that is likely to ensue.

In the course of his remarks the lecturer mentioned one little detail which interested me extraordinarily. When the Dukes of Carinthia in the old times were enthroned, the enthronement was sanctioned, or carried out, by the peasants. That took me back to what happens in many of the old states in

India, certainly in Udaipur. Sir Charles Yate will corroborate me when I say that there, when a new chief is put on the throne, the Bhils, who are the original inhabitants of the country, give their sanction in some kind of way to that enthronement. The Bhils are a wild, primitive people: the jungle people who have inhabited that country from time immemorial, and although this chieftainship is very old, yet the Bhils, the primitive people, are older still. It may be a thousand or two thousand years since the ruling family came in, but they have obtained their authority nominally ever since from these ancient inhabitants of the country, as is demonstrated on the occasion of their enthronement. Perhaps in this case the peasants giving their sanction to the enthronement of the Dukes of Carinthia dates back to some similar happening. Were the peasants the original primitive inhabitants of that district?

Mr. RONALD BRYCE: The Slovene peasants who anoint the Dukes came there about the seventh century.

The PRESIDENT: Then it does not seem to be quite parallel. But it happens in many cases that the ancient primitive people do anoint the rulers of the country. We are very much indebted to Mr. Bryce for having given us in detail an account of this very intricate and delicate operation. We all thank him, and hope that the country may progress peacefully.

THE INFLUENCE OF ITS GEOGRAPHY ON THE GROWTH OF LONDON

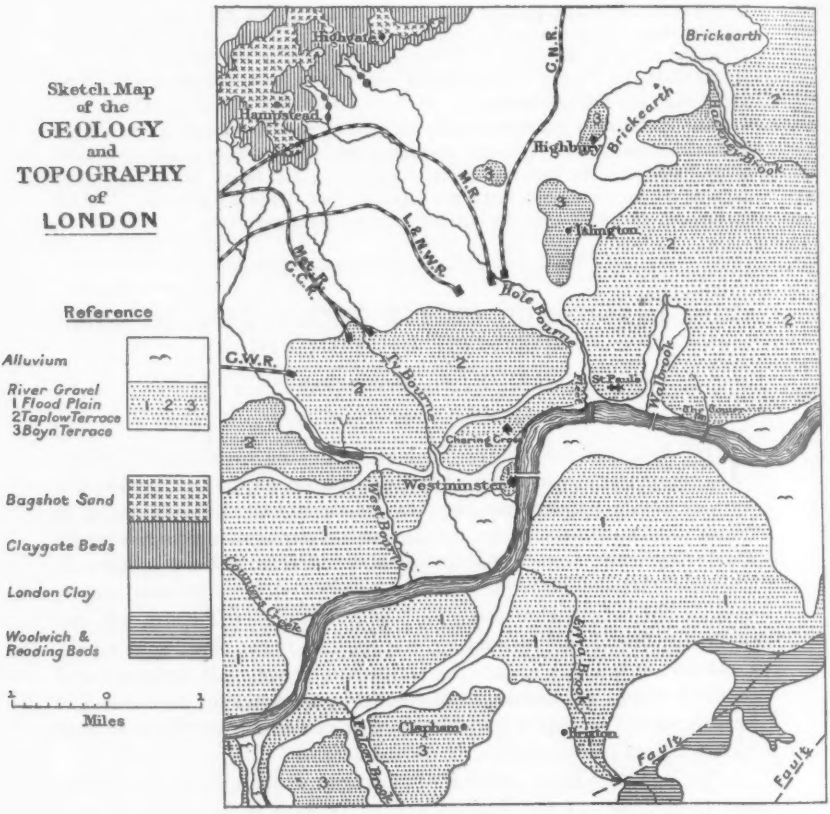
C. E. N. Bromehead

Read at the Meeting of the Society, 6 March 1922.

THE history of London is the subject of an immense number of works, the physical geography of fairly numerous papers and books; but the connection between the two has not, apparently, been discussed in detail. Before we can do so, the natural geography of the area must be briefly described: man's action during his occupation of the area has considerably altered his environment, by diverting streams to flush sewers, filling in the valleys, and reclaiming land from the tidal Thames, with the result that the natural features are not obvious to the observer nor indicated on any ordinary map. The map accompanying this paper is based on the 6-inch geological maps constructed by the writer for the Geological Survey; as the geology is fully discussed in various Survey Memoirs, only certain salient points need be mentioned here.

The London Clay, a practically impervious stratum, forms the foundation of this part of the Thames valley; beneath it the Woolwich and Reading Beds reach the surface on the south around Dulwich, while above it are the Bagshot Sands, pervious and water-bearing, found at Hampstead and Highgate; the alternations of sand and clay forming a passage between the two series are distinguished on the map with the title "Claygate Beds." Separated from the above strata, which belong to the Eocene formation, by a great interval of time are the deposits of the Thames, consisting of gravel, sand, brickearth or loam, and mud with seams of peat. The older

of these deposits are found at various heights above the present river-level, and are divided into High, Middle, and Low Terraces; the High Terrace gravels and sands occur as isolated patches at Highbury and Islington on the north, Wandsworth and Clapham Commons on the south, round about 100 feet above O.D. The Middle Terrace, 30 to 50 feet lower, stretches in a wide band through Kensington to the City and on towards the Lee valley; the deposits are mainly sand and gravel, but include also certain



small patches of sandy loam, termed Brickearth, which overlie the gravels. The only brickearth of importance for the present purpose occurs around St. Paul's, but as it has been utilized since Roman times little now remains, and it was found impossible to map. The Low Terrace covers a considerable area in Fulham and Chelsea, St. James's, Charing Cross, and the Strand; the bank between it and the Middle Terrace is a narrow outcrop of London Clay traceable west and south of the Geographical Society's

House, through Constitution Hill, St. James's Street, Lower Regent Street, and so on. Westminster Abbey stands on a little "island" of Low Terrace gravel surrounded by alluvial marsh. On the south of the river the Low Terrace deposits occur over much of Battersea, Lambeth, Brixton, and South London generally, as far south as the old river cliffs of London Clay at Clapham, Herne Hill, and Denmark Hill. The alluvium, consisting of mud with subsidiary beds of peat, occurs for the most part around the mouths of the tributary streams: within the area shown on the map, except near the eastern margin, the alluvium along the main river forms only narrow strips, but below London it widens out to an average of some 3 miles, forming the Isle of Dogs and the Greenwich, Plaistow, and other marshes.

In the area with which we are concerned the smaller streams flowing into the Thames have disappeared from view; their waters have for the most part been diverted into the main sewers, though in many cases the storm-relief sewers follow roughly the old courses; the valleys have largely been obliterated; these "buried rivers" of London have been described by H. G. Head, A. S. Foord, and others, but as they have had considerable influence on the manner of London's growth, a few notes must be given here. On the north side these streams are, from east to west, the Wall Brook, the Fleet, the Ty-burn, the West-bourne and the Counters Creek, besides one or more little streams crossing the Strand. The Wall Brook rose in Moorfields, crossed the city wall near Moorgate, and passing the Bank and Mansion House reached the Thames at Dowgate; it was navigable as far as Bucklersbury, where the name "Barge Yard" commemorates the finding of a barge when Queen Victoria Street was built. Stow tells us that in 1574 a youth of eighteen tried to jump the brook after a thunderstorm, but failed: he was carried down to the water-gate at the mouth and drowned. The Lang-bourne, mentioned by Stow as a tributary, is probably mythical.

The Fleet had several names—the River of Wells from the number of wells near its course, the Turnmill stream, and the Hole-bourne, which last may have been only a tributary; the Fleet proper is the navigable part, represented now by New Bridge Street and Farringdon Street up to Holborn Viaduct, but the name is frequently applied to the whole course. There were two headstreams, represented by Hampstead and Highgate Ponds respectively; the two united near Camden Town Station (N.L.R.) and flowed past old St. Pancras and Battle Bridge (King's Cross) to Holborn Bridge; the water-logged silt filling its bed has caused much trouble during the construction of the new Post Office buildings and tube at Mount Pleasant.

The Tyburn's principal sources were Shepherd's Well, Hampstead, and a spring near Belsize Manor; the streams met in Avenue Road and flowed by the west side of Regent's Park through Marylebone (St. Mary by the burn), following roughly the existing Marylebone Lane, crossed Oxford

Street by Bond Street Station, and on through the Green Park to Buckingham Palace. There the stream divided, the western branch flowing by Vauxhall Bridge Road to enter the Thames just above that bridge, the other turning east towards Westminster; before reaching the Abbey this stream again divided, the southern part following Great College Street, the northern finding an outlet to the river by Scotland Yard; this was made navigable as far as Storey's Gate, where the wharfs have been found, and was known as the Mersfleet; between these two branches lay the little gravel island of Thorney. A part of the course was made into an ornamental water called Rosamund's Pond, a favourite place of assignation in Restoration plays; Wellington Barracks are on the site.

The Westbourne, or Bayswater, rose near Cannon Hill, West Hampstead, the upper part being also known as the Kilburn. It flowed past the site of Kilburn Abbey and crossed the Great Western Railway near Royal Oak. At the instigation of Queen Caroline part of its course was dammed to form the Serpentine in 1730. On leaving the park it passed under Knights' Bridge, whence the course was through Sloane Square Station to the Thames at Victoria Pier; it is marked by the present parish boundary. The course of the Counters Creek, shown on the extreme west of the map, is occupied by the railway from Addison Road to Chelsea, the mouth still existing as Chelsea Creek.

The streams entering the Thames on the right bank are of less importance. The Falcon Brook flowed in the valley between Wandsworth and Clapham Commons and entered Battersea Creek; an old stream course running north-east to Nine Elms was probably an alternative exit. The Effra rises near the Crystal Palace at a height of 378 O.D., and follows a course of about 4 miles, past Herne Hill Station and through Brixton, entering the Thames near Vauxhall Bridge; it was navigable as far as Kennington Gate, where it passed under Merton Bridge, so called because Merton Abbey was responsible for its upkeep. In Queen Elizabeth's time a nobleman living at Brixton proposed to make it navigable for Her Majesty's barge as far as his house, but the project was not carried out. The Neckinger was a small stream rising near Denmark Hill and flowing through the low ground of Bermondsey; it crossed the Kent Road at a water-splash called "St. Thomas-a-Wáterings" by Chaucer. At an early date it was split up into a number of artificial channels to supply water to the tanneries, and consequently its natural course cannot be traced; some of these waterways surrounded Jacob's Island, mentioned in 'Oliver Twist.'

The springs of London have been of great historical importance; interesting details of many of them will be found in Foord's 'Springs, Streams, and Spas of London.' Those thrown out from the Bagshot Sands of Hampstead have already been mentioned as the sources of the Fleet, Tyburn, and Westbourne. Very numerous springs derived their water from the river gravels, and are to be found at the margins of those

deposits, either where the streams have cut through the gravels to the underlying London Clay, or at the lower margins of the terraces where the clay crops out: as instances of the first occurrence Clerken-well, Holy Well, Bagnigge, and Sadler's Wells in the Fleet valley, and the springs of Marylebone and Paddington beside the Tyburn and Westbourne may be mentioned; those from the edges of the terraces include St. Clement's, St. James's, and St. Govor's Wells; the last, mentioned and illustrated in 'Peter Pan in Kensington Gardens,' is on the edge of the Middle Terrace, the bank of clay between that and the Low Terrace forming "the Hump, where all the great races are run."

Having thus described the natural site of London, we can turn to the history of the human habitation. The reasons for the choice of the city area for a settlement have been discussed by many writers, but the influence of the topography on the subsequent growth has not received much notice. It has been mentioned that below London the alluvial marsh of the Thames becomes very wide; such a marsh formed an insuperable obstacle to primitive traffic, but near London Bridge the river was narrow and could be approached from either side, the gravels of the Middle Terrace on the north and Low Terrace on the south coming close to the banks. Here, then, was the lowest point where the river was fordable; and the lowest ford was important as providing the shortest route from the Kent ports, with their Continental trade, to the north and east of Britain. Where there is an important ford, there a settlement arises. The first London was on the north of the river, because the ground was higher, the water-supply better, and the natural defences more adequate. The essentials of the site are the twin hills capped by water-bearing gravels, separated by the valley of the Wall Brook, bounded on the west by that of the Fleet, and on the east by the low ground of the Tower and Houndsditch. The gravel area was comparatively open, in contrast to the bare London Clay to the north, which supported a forest growth; relics of the latter are preserved north of Hampstead and Highgate. The present highest point in the City, according to the Ordnance maps, is on the eastern hill just east of the Royal Exchange—O.D. 60·5, or 48 feet above Trinity High Water Mark; the traditional spot, on the other hand, is on the western hill, and is marked by the statue in Panyer Alley off Paternoster Row, with its inscription, "When ye have sought the City round, yet still is this the highest ground, 27 August 1688"; the height is 58 O.D. The original steepness of these hills has been much modified, not only by the partial infilling of the Fleet and Wall Brook valleys, but also towards the Thames by reclamation of land from the river. When London Bridge was last rebuilt three successive embankments were found, of which the oldest was some 60 feet north of the northern side of Thames Street. It is reckoned that, east of the Fleet mouth, a strip 2200 yards long and averaging 100 yards in width has been reclaimed; west of the Fleet

much ground has been reclaimed comparatively recently: up to 1767 the river-bank was along Tallis Street, a creek running up Carmelite Street to Tudor Street.

The beginning of a connected history of the settlement which became the city is in Roman times. No doubt there was a pre-Roman settlement of some sort, but it was too insignificant for Cæsar to mention, whereas Tacitus speaks of London as "copia negotiatorum et commeatorum maxime celebre." The early Roman camp was on the east hill, with the Wall Brook as the western defence; on the western hill the brickearth was worked, Roman kilns having been discovered in 1677 and again recently; later on, as the city grew, the western hill was included within the wall, built in the second half of the fourth century. The Fleet was now the western defence and remained so for many centuries, as long as London was a walled city. The mouth of the Wall Brook served as a port, Dowgate, above the bridge, Billingsgate being below. The traditional site of the battle between "Boadicea" and Suetonius at Battle Bridge may well be correct; Tacitus calls it a place with narrow jaws backed by a forest, which applies quite well to the Fleet valley where it leaves the Clay area. One effect of the building of the Roman wall may be noted: no adequate provision was made for the passage of the Wall Brook, and consequently a wide swamp was formed north of the wall, known as Moorfields.

Though London was probably as large in the fourth century as in the sixteenth, in early Roman times Verulamium (St. Albans) was of more importance. The Roman road from Kent, Watling Street, on its way to Verulamium and the north-west, passed by London and crossed the Thames at the next higher ford. This was at Westminster, and a small Roman settlement sprang up on Thorney Island. Southwark was not at this time an extensive marsh, as some writers have argued, but was dotted about with Roman houses, while an important cemetery has been located in Deverell Street, Bermondsey, where the road from Chichester to London crossed that to Westminster and the north-west. It is notorious that Roman roads paid little attention to minor natural features, making straight for their objective; that from London to the west and south-west, however, utilized the approach of the gravels to the river along the "Strand" and so reached Hyde Park Corner, where it crossed the north-west road from Westminster; presumably the bath in Strand Lane belonged to a suburban villa beside the road.

Of Saxon London we know comparatively little until it came into Alfred's possession in 886; he rebuilt the Roman walls. The system of Roman roads evidently survived, since it has been shown by R. A. Smith that the many Saxon churches fronted them; but it is thought probable that the site of St. Paul's was waste land when Æthelbert gave it to St. Mellitus. In 993 Olaf and Ethelred destroyed London Bridge, which, Thurlasen's Chronicle indicates, was built of piles.

Of Saxon Westminster we know rather more; the Abbey is not mentioned in Bede's history, which ends with 731, and the stories of Lucius and Sebert must be passed over. Offa's charter of 786 speaks of Thorney as "locus terribilis," and in 960 St. Dunstan chose it as the site of his Benedictine monastery on account of its seclusion, yet nearness to London; it would seem that the growing importance of London with its bridge had caused the ford to be practically disused. Dunstan's church and Cnut's palace, with their successors, gave a new importance to Westminster, but the island was small, the Mersfleet an insufficient port, and the growth of the settlement consequently small. The body of Harold I., the first king buried at Westminster, was exhumed by Hardacnut and thrown into "the fen around Thorney"; the monks recovered it and, rowing down to the Strand, buried it at St. Clement's. Many of the neighbouring hamlets now included in London date back to Saxon times, notably those on the low-level gravels, such as Fulham, Chelsea, and so on.

In Domesday Westminster is credited with nineteen villanes and forty-one cottages; most of the gravel area around London was under cultivation, but the great forest on the clay to the north is indicated by the amount of pannage for swine; it was broken by the villages of Hampstead and Islington, on outliers of Bagshot Sand and High Terrace gravel respectively. The Wall Brook was an important boundary in Norman times, having four wards on either side and separating East from West Smithfield, and East from West Cheap, names which may indicate that its use as a boundary goes back to the Saxon period; common councillors and juries were summoned half from each side; it was partly overarched in the fourteenth century. The Fleet remained as the western defence of London, the mouth being guarded by castles, but was also used as a port: Henry I. had stone for rebuilding St. Paul's taken up it toll free. In the thirteenth century some of the wharves were used for landing coal, and the name Sea-coal Lane for the lane giving access to the City still survives. In 1141 the Londoners received Queen Mathilda at Knights' Bridge "according to custom"; we may therefore regard the Westbourne as the boundary of greater London at that time. Fitzstephen's Chronicle notices many of the geographical features, such as the forest on the north, the streams, springs, and wells, the gravel and the marsh of Moorfields; he mentions that Westminster is joined to London by a suburb full of people, an expansion along the Strand and through the hamlet of Charing. It is interesting to note that in 1306 there were complaints that the tanneries were polluting the Fleet; eventually they moved to Bermondsey and utilized the waters of the Neckinger. Southwark had been burnt by William, but in 1086 Aylwin founded Bermondsey Abbey.

It is not till 1543 that we have the first map of London, Wyngarde's panorama; here Westminster is still practically confined to the Island of Thorney, though Abbot Wenlock (1283–1307) had long ago spoken of it as a town. Fitzstephen's "populous suburb" joining Westminster to

London appears as a thin growth along the Strand. Towards the river was a series of great houses; the earliest was the Savoy, first built in 1248, destroyed in 1381, and rebuilt 150 years later by Henry VII.; some of the water-gates of these palaces remain to-day. On the north side only mean houses along the road are shown by Wyngarde and Agas (1578); to the north of them lay open fields and the Convent garden. To the east of London growth was also slow; in Henry VIII.'s time Stow tells us that as a boy he used to fetch milk from the convent of the Franciscan Minoresses (the Minories), where forty to fifty milch cows were kept in the meadows. Southwark was practically confined to the river-bank and the inns along the Causeway.

After the Great Fire of 1666 a time of rapid expansion set in. In 1627 there were only five ratepayers under the heading "Piccadilly," and Faithorne and Newcourt's map of 1658 shows only one farm and the windmill in Soho fields, whereas in 1678 Richard Frith had erected 257 houses in these fields and laid out 300 more; the Panton estate was developed in 1670, and Bond Street had been cut through Clarendon House before the end of the century. By that time the whole of the gravel area east of the Tyburn had been built over, but the northern margin of the gravel remained also that of the town for some hundred years. Many maps might be adduced to support this statement, Rocque's, of 1746, showing the line very clearly. A single instance may be given here. In 1708 Great Ormond Street is said to consist of fine new buildings; in 1784, when the Great Seal was stolen from Lord Chancellor Thurlow at No. 45, the thieves got over the garden wall from the adjoining fields. The area to the north is shown as open country on a map of 1817, and Dickens, in 'Our Mutual Friend,' describes the district of Battle Bridge as a "tract of suburban Sahara." The great railway stations from Paddington to King's Cross lie close along this line (see map), since they were built as near in to London as reasonably open ground was available.

The limit of the gravel set a limit to building operations, because that deposit afforded the water supply. Wells sunk through the gravel, seldom more than 25 feet thick, to the London Clay were sure to tap a fair quantity of water, a fact well known at any rate from the Roman period; on the other hand it was not realized until recent times that larger and better supplies could be found beneath the clay at depths of 150 feet and upwards according to locality. It was for this reason that the areas of bare London Clay remained unoccupied till the advent of steam pumping and iron water mains. The outlying hamlets around London all originated on water-bearing strata, as pointed out by Sir Joseph Prestwich: Putney, Roehampton, Clapham, and Brixton on the south; Ealing, Acton, Paddington, Kensington, and Islington on the north, with many others, were on the river gravels, Hampstead and Highgate on the Bagshot Sand. The particular instance given above, the Great Ormond Street district, was

dependent on the well still to be seen in Queen Square. "It was a sight to see the procession of jug-carrying servants from the great houses and children from the poor houses making their way to the pump every day."

In the City of London many of the wells, such as Clerken-well, Holy-well, and Cornhill pump, were famous; the last bears an inscription to the effect that the well was first sunk in 1267. Stow constantly uses the wells as landmarks, often adding that a pump has recently been substituted for the buckets. But in such a densely populated area the supply from the gravel soon became inadequate in quantity and foul in quality —"decayed" is Stow's word. The terrible ravages of disease must have been largely due to the use of contaminated water. Several means were adopted for remedying this trouble, of which the earliest, the conduit system, goes back to the thirteenth century. Spring water from outlying districts was piped to the city. The springs were mostly near the banks of the streams, where the valleys were cut through the gravel to the clay beneath; but the popular idea that the streams themselves were utilized is wrong. The first conduit was from the Tyburn springs, situated near the present Marylebone Town Hall. In 1234 nine sets of elm pipes were laid; the route followed the Tyburn valley, giving its name to Conduit Street, then cut across by St. James's Church, Piccadilly, where a spring on the margin of the Middle Terrace was picked up, through Charing and along Fleet Street. Careful research by Dr. Morley Davies has given us many details of this first conduit. In 1355 more springs were taken over, and in 1433 pipes were laid to the Standard in West Cheap (Cheapside). In 1437 springs on the bank of the Westbourne at Paddington were piped to the Marylebone site. Many charitable bequests were devoted to the making of new conduits and the repair of the old. In the first half of the sixteenth century conduits were laid from Hackney to Aldgate, and from Hampstead to the city, leaden pipes being sometimes used instead of those made from elm trunks, which needed frequent renewals. Sir Hugh Middleton's New River, completed in 1613 and still in use, was a development of the conduit idea; water from the chalk springs at Chadwell and Amwell in the Lee valley was brought in an open channel to New River Head at Islington.

Another important means of supply was the London Bridge Waterworks. Much drinking-water had been drawn by hand from the Thames, but in 1582 a Dutchman named Morris (the name is spelt in many different ways) erected a water-wheel, driven by the tides, under the northernmost arch of London Bridge. This wheel worked pumps capable of throwing the water to a great height. The works lasted till 1817, four more wheels being set up on the north to supply the city, one on the south for Southwark. The tower whence the water was distributed was 120 high, but, being destroyed by fire in 1779, was rebuilt 30 feet higher. A guide-book to London in 1812 mentions that the wheels worked by the tide were sometimes aided by a steam-engine!

With the introduction of steam pumps and iron pipes a new era begins. The great water companies were founded early in the nineteenth century. They mostly drew their water from the tributary streams at first, though Thames water was soon substituted in many cases; thus the Vauxhall Company, founded in 1815, got supplies from the Effra; the Westbourne supplied the Bayswater district up to 1844, but, like all the little streams, it became too much polluted for use, and there is an element of truth in the nursery rhyme:

"The Bays came down to their water,
Neigh, Neigh, Neigh,
And there they found the Brindled Mules,
Bray, Bray, Bray:
How dare you drink of the Bays' water
That *was* as clear as glass;
How dare you muddy the Bays' water,
You children of an ass?"

The deep wells sunk to the Thanet Sand or underlying Chalk, though now very numerous, have had little effect on the growth of London; nor have the mineral springs been of much importance from this point of view, except perhaps at Sydenham and to a small extent at Hampstead.

When once the difficulty of a water supply was solved the clay areas were rapidly developed, and the outlying hamlets became linked up with London. Nowadays the topography has little influence; in fact, the streams, at any rate, have almost disappeared. The geology still affects the manner of growth, though in different ways: the gravel areas are, where possible, chosen for housing schemes, but not on account of the contained water; the gravel is used in concrete making, and cartage is saved if it is obtainable on the spot. The London Clay is an ideal stratum in which to construct tubes; the rapid development of the Golders Green district may be due to the Underground Railway, as a recent poster declares, but the railway in turn is due to the easily cut, yet impervious, bed of London Clay. Occasionally the clay helps to preserve open spaces; the angle of permanent rest is very low, and hill-sides composed of it, especially where the dip of the strata is down the slope, are liable to slipping; Terrace Gardens, Richmond, and Knight's Hill, near Dulwich, owe their escape from the builders' hands to the constant slipping of large and small masses of clay. The alluvium again is easily excavated, and lends itself to the construction of docks from the Queenhithe of Saxon times to the Albert Dock extension of to-day.

While it is obvious that the growth of London from a British settlement too insignificant for Cæsar's notice to the vast metropolis in which we live is due in the first place to its position at the head of the Thames estuary, I have endeavoured to show that the manner and rate of growth have always been influenced by the minor details of the physical geography.

NOTE.—The writer is a geologist, not a historian. The historical notes in this paper are all taken from published works, but these are too numerous for

references to be given. The publications of the London Topographical Society have been specially useful.

Before the paper the PRESIDENT said: I have now to introduce to you a very interesting figure. We have often welcomed discoverers of the North and South Poles, but to-night I am introducing to you a man who has been discovering the greatest city in the world—the city of London. The Geological Survey have only lately completed their survey of the drift geology, and one of their officers, Mr. Bromehead, will now give you an account of his study of the relations between the drift geology, the geography, and the growth of London.

Mr. Bromehead then read the paper printed above.

The PRESIDENT: It has been extraordinarily interesting to listen to this history of the growth of London, century after century, from the old British times without any break whatever. The influence of geology upon the growth of London was most distinct, I think, where that line of the London Clay stopped and the gravel began. It does not always strike us now how dependent people were in old days upon water from wells on the spot. The water difficulty having been overcome, London has expanded continuously up to the present time. But why in former times did they not think of planning the future growth of the city and leave means of exit from it? I know that you would like me to thank the lecturer for his graphical and interesting description of the growth of London, and the influence of geology upon the growth.

VOLCANIC ERUPTIONS ON THE CAMEROONS MOUNTAIN

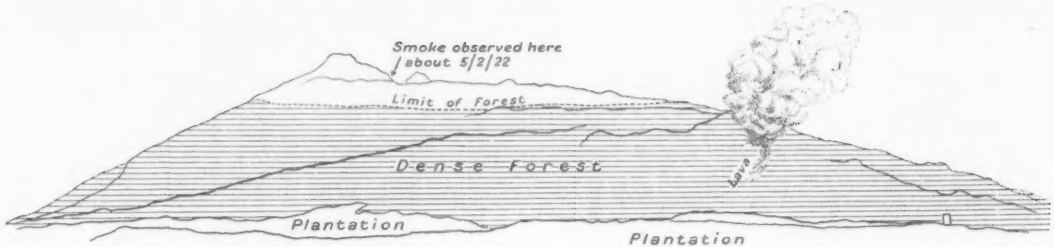
WE are indebted to Captain F. H. Ruxton for the following very interesting reports on a volcanic outburst on the Cameroons Mountain in February last. Writing on February 26 from the Residency, British Cameroons, he says:

By our monthly mail steamer I hear that at the end of January seismic disturbances down in this part of the world were recorded on instruments in Europe. I send you therefore copies of reports which have been sent in to the Director of the Geological Survey of Nigeria. On the night of February 2–3, Dr. T. Rice, C.M.G., Director of Medical Services, Nigeria, and Captain Mateer happened to be up the Cameroons Mountain, and the first indications of any disturbance was noticed by them. See Report A.

On the morning of February 3 at Buea I heard a curious rustling sound as of wind in trees, and at night saw a glow in the sky at 7.30 p.m. Rice and Mateer returned from their expedition, and confirmed our impression that the mountain was in eruption.

Nothing more was observed in Buea until February 14, when the first tremor, sufficient to waken me, was observed at 1.20 a.m. From then to February 23 many slight shocks were experienced at Buea, but no damage done.

On February 18 Mateer and Lee again went up the mountain, and found the crater a few hundred feet below the crest on the western side; it was then not in eruption. See again report A; also report B from Mr. G. Waldau, who has lived at Debundsha for very many years.



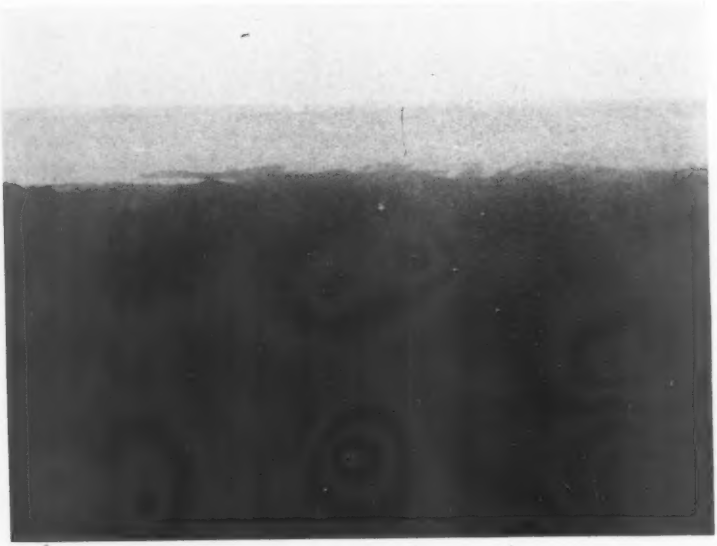
21 February 1922. Altitude of highest estimated 1000 feet.

22 February. Cones now formed and all trees destroyed.

Sketches of the Volcanic Eruption on the lower slopes of the Cameroons Mountain, by Mr. A. A. Reading.

LOOKING DOWN THE LAVA STREAM AT RETZLAFF-FELDE

THE LAVA STREAM AT RETZLAFF-FELDE



LAVA STREAM RUNNING OUT TO SEA

LAVA FLOWING DOWN A STREAM BED

On February 21 an altogether new crater was formed some 9000 to 10,000 feet below the first crater—in the midst of the forest belt, on the western or ocean side of the mountain and on about the same contour as Buea itself. This is fully described in Mr. A. A. Reading's report C. Clarence Peak in Fernando Po was quiescent up to the 22nd or 23rd as far as we know ; there is practically no communication with that island, though it is only 3½ hours' steam from Ambas Bay.

I had been up the mountain with Mateer in November, and then, except that the cinders were warm at the bottom of a depression at the very top, there was no sign of activity, and in fact there has been none since 1909, when the crater was formed over against Ekona, and every German fled from Buea.

A. **Report by Captain Mateer, A.D.O., Buea.** [23 Feb. 1922.]

On the night of February 2–3, Dr. Rice, the D.M.S.S., and I slept on the first ridge in the open at a height of about 10,000 feet. About midnight I felt three distinct tremors. The temperature was about 40° Fahr. Later I was awakened by Dr. Rice, who drew my attention to a brilliant red sky over the top of the mountain. We neither heard nor felt anything at that time. On the morning of the 3rd, at about 9 a.m. and at 12,000 feet, we were examining the bones of two dead carriers, when we felt a distinct shaking sufficient to make us sway. It appeared to be very close to the surface. I have previously experienced tremors in Demerara, but they were not of the swaying variety we felt at this time.

Shortly after we heard a noise not unlike wind in trees. The air was still at the time. I went ahead and towards the noise, passed over the second ridge in time to see a large spout of pink dust go up like a huge mushroom. As we proceeded the noise increased. The dust cloud was not very large, and small stones were being thrown up incessantly. The breeze during the night, and what little there was on the peak, was from the east. All the moss and lichen, I estimate to a width of 3 to 4 miles west of the eruption, was ablaze ; the reflection of this was evidently what we had seen during the night. Unfortunately the crater was behind a ridge, and we had not time to make détour and see the actual hole. The noise and shower of stones continued till about 5 p.m., having been most violent between 1 and 2 p.m. We returned to Buea the same night. On Saturday morning, the 18th instant, on receipt of instructions from the Resident, I again proceeded up the mountain in company with Mr. Lee, Marine Officer, Tiko. We reached the hut on the first ridge, 10,000 feet, at 12.30, and at 1 o'clock felt a violent, rapid vibration lasting 10 seconds. There was a thunderstorm in the afternoon, and mild tremors were frequent. At 7.8 there was one sharp shock, as though the hut had been hit. At 3.33 a.m. there was a shock that started violently, then gradually lessened, lasting over 30 seconds. Later, on the 19th, I went to the top, and thence to the ridge where I had seen the smoke apparently issuing on my previous visit. After much difficulty I reached the ridge and found only burning moss and lichen. Having gone over the ridge, I saw below me, just short of Arthurberg from where I stood, a new crater, undoubtedly the one I had seen with Dr. Rice and had thought so much nearer. Two streams of lava had flowed, one dividing itself round Arthurberg, and the other bearing to the right.

The crater I estimated to be 150 feet by 80 feet, and rising to a height of 50 feet. A small column of smoke or steam was rising from the crater. The lava had set, but was too hot to examine very carefully. Samples are being sent by separate post. The ground in the vicinity was shaking almost incessantly.

Unfortunately, I lost so much time in locating the crater that I had no time to complete my investigations, as I had to meet Mr. Lee on my return.

B. **Report by Mr. G. Waldau, Manager of the Debundsha Plantation.** [16 Feb. 1922.]

The earthquake and eruption of the Cameroons Mountain in 1909 seems to have been the first one recorded by Europeans.* At that time the Bakwiris said that some of their oldest people had in their youth had a similar experience. It may have been in the fifties of last century.

On February 3, in the morning we heard here in Debundsha a noise as from a tornado far away on the mountain, but it differed from a tornado in going on without interruption till 5 or 6 o'clock in the evening. Every now and then a louder sound reached us. Nothing was seen here. In Bibundi the noise was also heard. Canoe people coming from Batoki did not hear the noise from the mountain before they had passed Isongo. The next morning Mr. Reading said he could see smoke rising west of the Peak, in 104° mag. (91° true).

February 9 my people told me that they, when on the plantation, had heard the noise on the mountain again about 5 o'clock in the evening, but not so strong as on the previous occasion. From the beach here it could not be heard on account of the surf. By 10 o'clock the same evening I saw fire on the mountain in 65° mag. (53° true). The fire was constantly rising and falling, showing that the eruptions were coming in quick succession.

The earthquake and eruption on the night of the 12th instant were not noticed here. I was then in Oechelhausen, where nothing was heard. The higher parts of the mountain cannot be seen from that place.

On the evening of the 14th instant my people in Debundsha saw fire at the same place as on the 9th. No noise was heard.

The place of the eruption seen from here seems to be south-west from Mungoma-Loba, in the vicinity of the old volcano "Isabella."

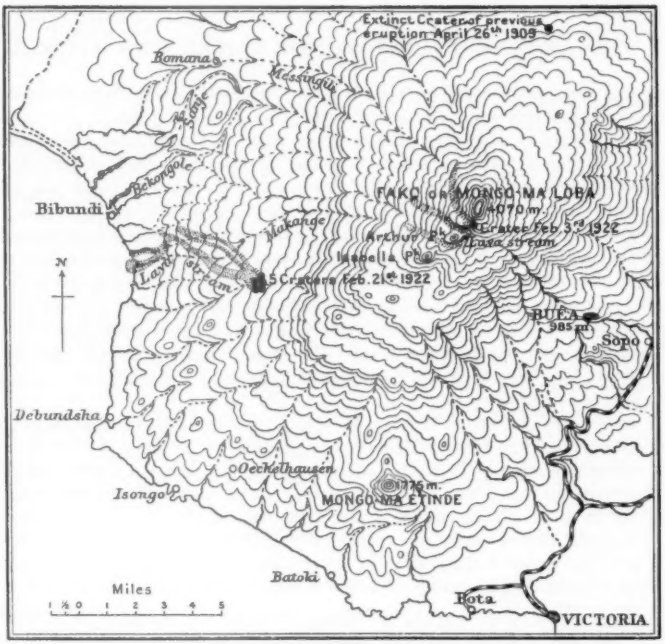
Our Balundu labourers (that name is here down applied to all the people north of the mountain except the Bakosis and the Banyangs) take no notice of it at all, as they have no experience of earthquakes and volcanic eruptions. Although the eruption of 1909 was best seen from the Baji-Bakundu side of the mountain, it was at such a great distance that the people saw not much difference in it from the big fires seen every dry season when the dry grass on the mountain is burnt by the hunters. Even the mountain people seem not to fear the outbreaks, as they have not suffered from them.

C. **Report of Mr. A. A. Reading, Manager of the Bibundi Plantation.** [23 Feb. 1922.]

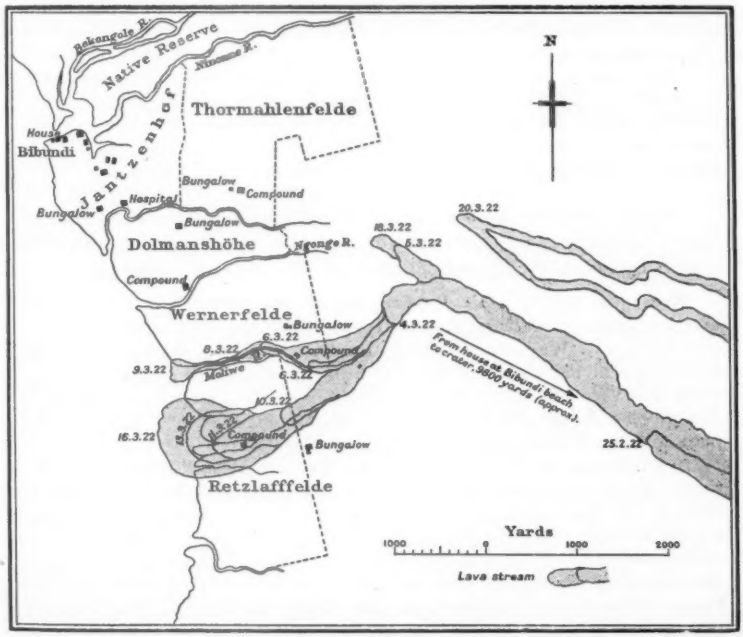
As reported over the telephone yesterday morning, there has been a volcanic outburst close to the Bibundi plantation. In the last ten days or so we had experienced earthquake shocks, which became very frequent in the last few days: on the 18th we had a sharp one at 12.30 p.m. On the 18th we had seven between 8 a.m. and 2 p.m., whilst in the early morning of the 21st we had two severe shocks.

At about 6.10 p.m. on the 21st instant attention was called to a fire in the forest on the side of the mountain. At first glance it looked just like a small bush-fire, and for three or four minutes it remained so, only growing larger. Then another similar fire was observed about 4 degrees to the left; these fires then grew rapidly, and spouts of flame were shooting high up into the sky,

* See short account of the 1909 eruption, by Boyd Alexander, in *Journal*, vol. 34, p. 52.



The Cameroons Mountain.



Progress of the Lava Streams, from maps accompanying reports of **Mr. A. A. Reading.**

making it apparent that they were volcanic. By 6.30 the whole area between the two original fires was one blazing mass.

There were five distinct spouts of fire, and the appearance was as roughly shown in sketch 1. The outburst continued in this state until about 9 p.m., when the whole area became obscured by smoke and remained so throughout the night. Lava was observed flowing from the right edge.

During the day of the 22nd the whole area was so enveloped in smoke and cloud that nothing could be seen, except the track of the lava descending the side of the mountain. Towards dusk, however, a breeze sprang up and cleared the whole mountain side. A splendid view was again obtained, and visibility remained good throughout the night. The appearance had altered considerably since the previous night. Three spouts of flame only were now to be seen, but they were intensely brilliant, and the spectacle was quite as magnificent as before.

I have tried in sketch 2 to give some idea of the appearance. The pyramid on the left, which had been formed by the burning masses thrown up, was a wonderful sight. The top and part of the way down the sides were an incandescent mass of white, which showed up in contrast to the red fountain of flame at its side. These spouts of fire were rushing out at a great velocity, and I estimate that at times they reached a height of 1000 feet from their base,

I enclose a sketch-map showing the position of the outbreak. I have checked the position by taking bearings from several points, and think that I have got it right to a few hundred yards. I have not the maps or instruments to place it more accurately than that. The altitude above sea-level I should guess at from 3000 to 3500 feet.

I also enclose a panoramic sketch taken from the house here, which shows how far away from the main peak, or really from the actual mountain itself, the outbreak occurred.

I have approached within less than 2 miles of the lava-stream, and could distinctly see the burning trees as they were set on fire by the molten lava. It is difficult to get close, as the lava is still in the dense forest. It is, however, now only 3000 yards from the edge of the plantation, and should it reach there I shall have excellent chances of viewing it, and will report further.

We are indebted to Mr. F. Evans, Superintendent of Plantations, British Cameroons, for later news of this very interesting eruption, from reports by Mr. A. A. Reading, illustrated with plans and photographs.

Writing on March 13, Mr. Reading says: "The volcano is just as active as ever, and makes more noise than at first." On March 21: "The volcano is still active. . . . We have made many attempts to obtain photographs of the scene, both at night and by day, but owing to the dense smoke and ashes rising it is very difficult to obtain satisfactory results. Even from the sea it is a problem, as the lava has extended roughly one-third of a mile out, and huge columns of steam are continually ascending."

In a fuller report, dated March 22, Mr. Reading says: "Further observations confirm the location of the craters, . . . 9900 yards from the house a Bibundi Beach to centre, on magnetic bearing 128°. . . . The altitude is abou 8°, which would make the height above sea-level about 4150 feet. . . . The craters appear to be just as active as ever. Some days the noise is quite loud, like a blast furnace; other days there are series of explosions like a big gun firing. Some days we get showers of ashes which fall like rain, . . . so heavy that the weight breaks the leaves of the palm trees. The lava-stream when on

open ground comes along like a wall of red-hot rock 30 or 40 feet high, which keeps falling away in front as it advances; but when it came down the deep ravine between Wernerfelde and Retzlaffelde it flowed like a red-hot river at the rate of about 2 feet a minute. Since the outbreak of the volcano we have not experienced any severe earthquakes, though we frequently feel the house shaking. I have been round the edge of the lava where it runs into the sea. I could not approach nearer than about 300 yards on account of the heat. At that distance the sea was so hot that you could not put your hand into it. Many dead fish were observed."

From the large-scale plans attached to Mr. Reading's reports the accompanying sketch has been made to show the progress of the lava-streams. The material damage to March 22 comprised the destruction of about 160 acres of plantation, with two native compounds, and the interruption of the main road and the plantation railway. Its long duration makes this eruption of particular interest, and we shall look forward to receiving later news.

THE MOUNT EVEREST EXPEDITION

THE high hope in which we ended our account last month has been dispelled by fuller news of the second climb, and by a grave accident that befel the third attempt, with the loss of seven of the splendid porter corps to which so much of this year's success has been due. This disaster—the most serious that has ever befallen a British mountain party—happened on June 7, but the news did not reach England until July 15, only one day before the arrival home of Captain Finch, who had actually started up the line of camps with the party on June 3, but had been obliged after the first day to admit that he had not recovered from his immense exertion of the week before, and came back just in time to join the first homeward party conveying Major Morshead to Darjeeling. A brief summary of the cabled news can now be amplified from the report of Colonel Strutt, Dr. Longstaff, and Captain Finch to the Mount Everest Committee at their meeting on July 17.

When the oxygen gear was assembled at Camp III about May 20 it had suffered from the accidents of travel, but more from the unexpected effects of the dry Tibetan climate on asbestos washers. By hard and skilled work Captain Finch was able to repair much of the damage, so that on May 25 he, with Captain Geoffrey Bruce, a Gurkha N.C.O. Tejbir, and nine porters, started from Camp IV and made a camp VI about 500 feet higher than Mallory's Camp V, but on the northern arête, whereas Camp V had been driven east of the arête by the wind. At Camp VI the party were stormbound for the night of the 26th and the whole following day. On the second night they were able to sleep fitfully by inhaling a quarter ration of oxygen, and the following morning the three started upwards, Tejbir, who was also using oxygen, carrying the great

load of six cylinders, the others four. At 26,000 feet the gallant Gurkha fell out, while Finch and Geoffrey Bruce, finding the arête too windy, struck across the northern face to a point on the summit ridge halfway between the pinnacle 27,390 at the shoulder and the summit. Just below this ridge an accident to Bruce's oxygen apparatus was remedied by Finch's resource in the most awkward conditions; but they had reached the limit of their powers, for an unexpected disadvantage of oxygen appeared: they could not carry enough food to satisfy the hunger it induced. About 30 feet of step-cutting and a short rock pitch would have taken them on to the ridge; but they could see just ahead a cliff of 50 feet which would have required a long détour, and just below the summit a much more serious impediment in a hanging glacier and steep rocks which would have been formidable on a Swiss mountain. They were therefore obliged to retreat; and picking up Tejbir at Camp VI they made the tremendous descent to Camp III that same evening, arriving utterly exhausted and all slightly frost-bitten.

General Bruce's long cablegram embodying Finch's story of this exploit was dated June 2, and a third attempt was already preparing. Morshead, seriously frost-bitten; Norton, who had spent his last ounce of strength in helping Morshead down on May 22; and Geoffrey Bruce, with frost-bitten feet, were all out of action; but Somervell had completely recovered, and Mallory and Finch were ready to go with him on a third attempt, with Wakefield and Crawford in support. They started up the line of East Rongbuk Glacier camps on June 3, but the same evening the breaking monsoon started a snowstorm lasting thirty-six hours. Finch reached Camp I, and was then obliged to give up and return. The others got to Camp III on June 5, rested a day in glorious sunshine on June 6, and the following morning started for the Chang La. On the lower slopes the snow seemed sound, and they were halfway up when the whole party of three climbers, Mallory, Somervell, and Crawford, with fourteen porters, on four ropes in all, were swept down by a sudden slip of the snow, which carried two of the porter sections over a small ice-cliff into a deep crevasse. Two were dug out alive, and after great exertion six bodies were recovered, but a seventh man could not be found.

So the third and last possible attempt of the 1922 expedition ended in disaster, which narrowly escaped being more than twice as great. The glacier camps were to be evacuated at once, and the last of the party hoped to be clear of the windy dreary Rongbuk valley by the middle of the month of June. "After six weeks of this infernal camp I deserve a half-holiday," wrote General Bruce in his last letter, proposing to go down to the Kharta valley for a while before returning to India, where he is due about the middle of August. Norton, Geoffrey Bruce, and Tejbir had already left for Kharta on June 5, travelling with Strutt, Longstaff, Morshead, and Finch, who were taking Morshead down for hospital treatment,

in grave anxiety whether it would not be necessary to operate on the way. This was happily averted, and a troublesome foot was saved; but it is feared that Morshead will lose the top joints of three fingers of the right hand, and all his many friends will sympathize with him in the unhappy result of his stout efforts on the mountain. Colonel Strutt, Dr. Longstaff, and Captain Finch have returned professing good health and complete recovery on the voyage home, and have made a very valuable report to the Committee.

From their account the Committee have concluded that the difficulties and hardships of the Expedition have—very properly—been understated in the cabled reports from General Bruce, and that the published accounts do not give any idea of how formidable the mountain really is. The last 1700 feet are difficult and ascent impossible unless there are four consecutive fine days. The work of the porters was beyond all praise, and the fact that all but one old soldier of 40 were young men about 22 supports the conclusion drawn from the climbers, that youth is a principal requirement. This year all the climbers went near the limit of exertion, and some overstepped it. Only one man recovered at all quickly and in a few days seemed none the worse after the high climb. The use of oxygen improved the rate of ascending, and even more of the descent; but the after exhaustion seems to have been greater, and the arguments for and against its use will be protracted.

The Tibetan authorities and the Chief Lamas of the monasteries were in every way friendly and helpful, and much appreciated the party's scrupulous observance of the undertaking not to shoot. The sanctity of the Rongbuk valley made it in some ways inconvenient for a base camp: for example, no sheep might be killed for food within 20 miles of camp; and the valley was, as we knew before, quite destitute of supplies: a cold and gloomy corridor with a furious wind always blowing. The idea brought back last year that the ante-monsoon season would provide the necessary fine weather was much too sanguine; but there has been no tendency this year to extol the probable superiority of the post-monsoon. The truth is probably that the weather about Mount Everest is nearly always wild, and the greatest obstacle on a mountain already difficult enough. The "easy snow slopes" gave way last year to rock that looked as if it might be bedded favourably, and proved on trial this year to be quite the reverse. The difficulties of the summit ridge have been described above. Last year the East Rongbuk glacier, very imperfectly reconnoitred, appeared to offer a simple way to the eastern face of the Chang La. This year it provided on acquaintance a very arduous route, and we should not be surprised to learn that the main glacier and the western face of the col are not more difficult, and a good deal more direct: until perhaps they are tried on a third expedition.

Last year's expedition was tentative and prolonged, in its way leisurely. This year's has been short and severe, and the last members of the

expedition will have left the Rongbuk valley less than twelve months after it was first entered by Mallory and Bullock in 1921. The Committee had proposed that full use should be made of the whole summer, and were prepared if necessary to send out reinforcements for a post-monsoon campaign; but the general exhaustion of the whole party within six weeks of establishing the base camp has made this out of the question. That is one of the grave disadvantages of the Rongbuk side: there is no agreeable rest-camp, as at Kharta, to which worn-out men may go down and recuperate.

Sooner than was expected, then, we may begin to sum up the results of 1922:—the establishment of the whole force in position with full equipment at the earliest possible date; all records broken, and 26,800 feet reached on May 21 without oxygen; records broken again a week later and 27,300 feet reached with oxygen; a gallant third attempt, if in the circumstances a forlorn hope, defeated ten days later by fresh heavy snow and consequent disaster: a greater achievement than to many seemed possible, yet falling short of the goal by 1700 feet. The Mount Everest Committee have lost no time at either stage in conveying to the leader and his staff their high appreciation of the triumphs won, and at the end they have had the sorrowful duty of asking General Bruce to see that suitable provision is made for the families of the gallant porters who had served so nobly and fallen in the last assault.

REVIEWS

EUROPE

The Rainfall of the British Isles.— M. de Carle S. Salter, Superintendent of British Rainfall Organization (Meteorological Office). London: University of London Press. 1921. Size 7½ × 5. Pp. 295. *Illustrations and Maps.*

THIS volume is a condensed and much-needed summary of the extensive knowledge of the regional and seasonal distribution of rainfall which has been gleaned since the foundations of the survey were laid by the late Mr. G. J. Symons in the 'sixties. It is no mere uninspired compilation of statistics, and Mr. Salter may be congratulated on having produced a thoroughly readable book which makes some attempt, on the whole successful, to account for the interesting facts disclosed. The definite double oscillation in the seasonal distribution such that, relatively to the annual average of the respective districts, the western part of the kingdom is wet in winter, the eastern part in summer, whilst spring is everywhere dry, and autumn everywhere wet, is discussed at some length but only partially explained. Mr. Salter classifies the types of rainfall which prevail in these islands in three main categories, viz. "cyclonic," "convectional," and "orographic." This is undoubtedly a convenient division, but, as he himself indicates, there are no hard and fast lines between these types. One suspects, indeed, that if the microscope were applied to the circulation associated with many of the so-called local convectional or thunder rains at least the rudiments of a cyclonic structure would

be disclosed. As to the orographic rains which swell the annual totals so enormously in the mountainous districts, Mr. Salter points out that they appear to be not entirely dependent on configuration. Air-streams will, if they can, flow round rather than over a hill, which explains why the orographic effect on isolated hills is relatively small; and, in general, heavy orographic rainfall will occur only when the currents have a tendency to rise on th eir own account in favourable types of circulation. The interesting feature is demonstrated that the bottoms of long deep mountain valleys, often not very much above sea-level, share in the heavy rainfall of the surrounding heights.

The severe conditions of snowfall in all the elevated regions of the British Isles are incidentally touched upon here and there; but the subject requires greater emphasis, because in a country where excessive dampness rather than hard frost marks the winter climate, and where the mean temperature at sea-level is some 6° Fahr. above the freezing point, the discordance between the snowfall of the bleak uplands and the milder lowlands is exceptionally great. The book ends with a good chapter on the economic applications of a knowledge of rainfall.

In a discussion like the present one cannot but feel the inconvenience of a too rigid adherence to political boundaries. For instance, in the present case a comparison with the rainfall of northern France and Belgium would have been instructive. The British Isles as a whole do not form a good climatological unit, and southern England is climatically much more akin to northern France than to northern Scotland. L. C. W. B.

The City of Glasgow: Its Origin, Growth, and Development.— Edinburgh: Royal Scottish Geographical Society. 1921. Pp. 79. *8s. 6d. net.*

This volume is the special "Glasgow Number" of the *Scottish Geographical Magazine*. It consists of ten articles on various aspects of the city by different authors, with an editorial introduction, a bibliographical note, and reproductions of several early maps and illustrations. In some respects it is akin to the Handbooks to several important towns which have been published in relation to the British Association meetings, and in the quality of its contents it will bear comparison with the best of that series. The sections which are of most directly geographical interest are those on "Glasgow and its Geographical History," by Professor J. W. Gregory, "The Rise of Trade and Industry," by W. Power, "Overseas Relations," by A. Stevens, and "L'Envoi," by Sir H. J. Mackinder; though all ten play an essential part in building up the impression of a vigorous and adaptable community.

Glasgow is the bridge-head town of the Clyde estuary, and hence is one of the large class of estuary ports, which includes several of the world's principal seaports. Although the river below Glasgow Bridge was fordable, at low tide, until the artificial deepening which began in the middle of the eighteenth century, it was generally too wide to be readily bridged. The status of Glasgow as the principal burgh in lower Clydesdale was actually determined when it was chosen as the seat of the bishop and the old bridge built across the river. The possession of the bridge made it the chief nodal point, and the powers and privileges of its bishops secured for it a greater stability than that of many other Scottish burghs in the turbulent middle ages and many advantages in its struggles with rival towns, not the least of which was the founding of the University in 1451. The city remained under the control of its bishop (after 1492 an archbishop) for more than a thousand years before the Reformation removed the protection of the Church and set it free to meet the modern world.

The account of the "People of Glasgow" contributed by Professor Bryce has much more than a local importance. His conclusion is that "In the West to-day the ancient blend of Iberian and Alpine races, with the Iberian as the dominant, is in the majority" (p. 20). Alongside this view of the continuity of the chief elements in the population since the Neolithic and Bronze Age settlements may be noted the claim, not without foundation, that Glasgow is "the oldest of Scottish towns" (p. 3).

The great event in the early growth of Glasgow as a great city, emphasized by at least three of the authors, was the Union of England and Scotland, which opened the English colonies to Scottish merchants. Between the Union and the American War of Independence, Glasgow became the chief centre of the tobacco trade, importing in 1773 no less than 49,000 hogsheads out of a total of 90,000 for the whole kingdom. Later this specialized trade gave way to a more general trade with the West Indies and other colonies. To provide outward cargoes for its ships manufacturing was developed, and here "Commerce was the mother of Industry" (p. 41). Such a development of industry in order to maintain trade, and the capital accumulated in trade, has been recently advocated as essential in London if that port is to retain its commercial importance.* The second great event was the introduction of the steam engine, which enabled Glasgow to become a great centre of industry, exploiting the coal of Lanark and the cheap labour from Ireland (p. 41), while the variety of its interests prevented too exclusive specialization on any single form of industry. But perhaps the greatest work done here has been the formation of the navigable Clyde, which is almost as wholly an artificial waterway as the Manchester Ship Canal.

The claim made here (p. 2) and often elsewhere, that Glasgow is the second city of Britain is based only on the population within the city boundary. As a populous urban area Glasgow, with its suburbs, ranks not second but fifth in Great Britain, since the Manchester, Birmingham, and West Yorkshire groups each contain more inhabitants. Like these other cities its modern greatness is largely a result of the momentum acquired in the past, a fact which is clearly set out in the characteristically eloquent and brilliant *Envoi* with which Sir Halford Mackinder concludes the volume.

The editors may be congratulated on having reduced to small dimensions the inevitable overlapping between the work of different writers. To the reader who knows little of Glasgow the book will convey a vivid impression of the growth of the city and illustrate the basis for the not too-modest claim that it is "the most versatile and virile of British cities"; and it should certainly be read by all geographers and others interested in the study of towns.

C. B. F.

The Story of Shoreham.— Henry Cheal. Hove: Combridges. 1921. *7s. 6d. net.*

This local history is for the most part occupied with matters which will appeal chiefly to those who are already interested in the district. In the introductory first chapter the author states that the first Saxon chief to invade Sussex, Ella, established himself in possession of the district comprised in the modern counties of Sussex and Surrey, and formed his newly acquired province into a kingdom. It is not clear whether the kingdom referred to included Surrey; and it would be of interest to know the evidence for the view that Surrey was conquered from Sussex (presumably along the Stane Street). The writer

* Cf. Sir J. G. Broodbank's 'History of the Port of London,' recently revie wed in this *Journal* (vol. 59, p. 462).

does not mention any specific authority for this statement. On pp. 20 and 21 are seven maps of the mouth of the Adur from the thirteenth to the nineteenth century which illustrate very well the changes of the coastline here. These maps and the account of the effect of the coastal changes on the seaport are likely to be of great interest to geographers, as this estuary is typical of many on our south coast. Apart from the effect of changes in its harbour, the port of Shoreham has suffered vicissitudes akin to those of all our small ports. In the days of small ships and bad roads it served a small hinterland for most of its trade; now it is only a local port for the towns from Brighton to Worthing, importing coal and exporting cement made locally, with little other traffic. The book is welcome as a useful contribution to the study of local history, and students of mediæval social conditions will find it a mine of illuminating details. C. B. F.

Hampshire.— Telford Varley. Cambridge University Press: 1922. Pp. xi., 212. 3*s.* 6*d. net.*

The uniformity of the series of Cambridge County Geographies gives little scope to the authors. They must collect information about the county on which they write, put it under the appropriate heading in the rigid scheme of division and subdivision, and clothe it in clear language, with illustrative diagrams, maps, and photographs. Mr. Varley has done this quite successfully, and produced a small book on Hampshire which ranks high in the series. We think he would have done better if he had been free to write a geography in which a regional treatment was frankly accepted and scope given for showing the inter-relations of the phenomena instead of grouping them in successive and distinct chapters. It may be necessary to preserve uniformity in the series, but this prevents advantage being taken of the advance in the method of geographical study and expression which has been achieved in the last few years. Perhaps the series is intended to be as much a guide-book for residents or visitors as a geography, and that may of course justify the inclusion of much of the material, such as the chapter "Roll of Honour," which is certainly not relevant to a geographical study. Yet the series as a whole, and Mr. Varley's book in particular, do contain much material of which the geographer must make use. J. F. U.

ASIA

Soldiers of the Prophet.— Lieut.-Colonel C. C. R. Murphy. London: John Hogg. 1921. Pp. 233. 10*s.* 6*d. net.*

This book is as diverse in its range as the "common saying in Damascus" quoted on its first page:

"There is wisdom in India; pride in Persia; hospitality and bravery amongst the Arabs; truth in Abyssinia; heroism and dash amongst the Turks and Kurds; treachery amongst the Armenians; ignorance in Damascus; knowledge in Irak; arithmetic amongst the Copts of Egypt; stupidity in the tall; lying in the short; memory in the blind; ill-nature in the lame; haste in boys; hypocrisy in the learned; greediness in the old; meekness in orphans; peace in solitude; and health in abstinence."

The first two chapters describe the Turkish punitive expedition to the Hauran (Bashan) in 1910 and the Arab revolt in Kerak (east of the Dead Sea) which followed. The third chapter gives an interesting account of Baalbek—still, with its blocks of stone weighing hundreds of tons apiece, one of the wonders of the world. We are then transported to the Persian Gulf, where the author witnessed the punishment of some piratical villages near Bushire

in 1913 and the operations against the Oman rebels early in 1915. The campaign in Iraq in 1914, the success of which was partly due to the excellent intelligence supplied by the author and his "agents," is described first from our point of view and then from the Turkish. Colonel Murphy mentions the curious fact that the battle of Sahil, which led to the capture of Basra, was ignorantly so called because the word "Sahil," which means "beach," happened to be printed in our maps across the particular tract of the river where the action was fought. An account of the position in Gallipoli in 1914 follows, with the dictum that "if the various expeditionary forces from India had been flung on to the Gallipoli Peninsula in November the Great War would have been over in the spring of 1915." Statements compiled from Turkish sources describe the organization and distribution of the Turkish army at various periods of the war. The events in north-west Persia during 1914-1918 are summarized; thence we are taken to the Crimean battlefields, which the author visited in 1910, and so back to the Persian Gulf in the months before the war. The last chapter describes Constantinople in the weeks following the armistice.

A collection of reports rather than a book, containing valuable new facts for the historian. E. H. K.

AFRICA

Savage Sudan: Its Wild Tribes, Big Game, and Bird Life.— Abel Chapman. London: Gurney & Jackson. 1921. 248 *Illustrations and Sketch-maps.* Pp. xx. and 452. 32*s. net.*

In the preface to his book Mr. Abel Chapman tells us that it is an attempt to describe the Sudan from the standpoint of the hunter-naturalist. Few writers can have more satisfactorily achieved their aim. And while big game and bird life receive most attention we are given an arresting picture of the country itself, together with some account of the Nilotic tribes. In these pages we get the true atmosphere of the Eastern Sudan, while as a zoological survey it is more exact and much more comprehensive than any other book on the country, though not all of the author's conclusions are likely to find acceptance among naturalists generally. It is written with that evident enjoyment of the ways and workings of nature in her most primitive aspects which we have learned to expect from Mr. Chapman, who is, since the passing of Selous, probably the best known of living hunter-naturalists. Besides the usual illustrations from photographs the book is enriched with a large number of those admirable drawings of birds and beasts which the author makes from the life, and which he modestly describes as rough sketches.

Mr. Chapman's method is to give a record of travel and hunting adventures, with special chapters devoted to particular species of game interspersed, but so interwoven with the narrative portion as to lure the non-technical reader to their perusal. One of the real merits of the book is that it appeals strongly to those who find distasteful a mere record of big-game shooting. The author himself was not intent on making a "bag," and almost the only occasion on which our sympathy is with the hunted rather than the hunter is in the account of the killing of two magnificent buffaloes.

The book begins with the landing at Port Sudan, goes on to describe the eastern desert and then the voyage up the Nile past the sudd to Rejaf, some account being given of Nile angling and of the Shilluk, Dinka, and Nuer, with a passage or two about the Niam Niam. These last, we are told, have taken to breeding dogs for food as "the best substitute" for human flesh, which the white

man has forbidden them to consume. On the Nile journey we get choice stories of lion, buffalo, hippopotamus, antelope, and the danger of attack by infuriated bees. We have accounts of bird life in such abundance as almost to stagger belief. Attention may be called to the discovery in the Upper Nile of "hippos" which habitually spend the whole day ashore. Returning to Khartoum the author takes us up the Blue Nile and Dinder, thence to the Red Sea hills and islands; we finally leave the Sudan, and our guide, with reluctance by the northern desert. Appendices deal with the giant eland, the white rhinoceros, and colour protection. We have noticed but one geographical error of any moment; the Anglo-Egyptian Sudan does not cover a fifth part of Africa, but scarcely an eleventh part. F. R. C.

An Introduction to the Flora of Natal and Zululand— J. W. Bews, M.A., D.Sc. Pietermaritzburg: City Printing Works [London: Wheldon & Wesley]. 1921. *Price* 15*s.*

This will certainly prove an indispensable *vade mecum* for the student of the flora and plant ecology of Natal and Zululand, as it gives a complete list, systematically arranged, of all the species so far recorded, with concise indications of their distribution and the nature of their habitat. A short introduction sketches the history of botanical exploration in Natal, giving the names of all who have contributed in any important degree to making known the plant-life of the colony within the past hundred years. There is also a select bibliography and a useful key to the families. No one has done more than Dr. Bews to extend our knowledge of Natal botany within recent years, and his promised general ecological account of Natal vegetation, originally intended to form part of the present work, should be of still greater interest from a geographical point of view.

The Soul of Central Africa.— The Rev. John Roscoe. Pp. xvi. and 336. 56 *Plates and Map.* London: Cassell & Co. 25*s. net.*

During 1919–20 Mr. Roscoe carried out ethnological investigations among various tribes in the Uganda Protectorate, and in 'The Soul of Central Africa' he gives us the general result of his work, reserving for publication elsewhere the information gathered of a "more purely scientific character." Mr. Roscoe's competence for the task he undertook is well known to all interested in African ethnology; his studies of the Baganda are highly esteemed. In the present volume he deals principally with the Bahuma of Ankole, the Bunyoro, and the Bagesu of Mount Elgon. Much of his information was gathered by patient questioning of individuals who could tell of ceremonies and beliefs current before the advent of the white man. Even in the heart of Central Africa customs are changing with apparent rapidity, and we are grateful to Mr. Roscoe for having rescued this record before knowledge of ancient ways had been lost among the tribes he visited. The story is of great interest and helps forward our understanding of primitive man and his intense belief in the world of spirits. It tends to show, under varying local conditions, the universality of certain conceptions; it has already been observed that parallels to the beliefs of these African tribes are to be found among the Semitic and other peoples.

Apart from its ethnological aspects this volume may be commended for its topographical setting. It is in the form of a narrative of travel and in simple style presents what every one will recognize as a true picture of what the country looks like. This effect is in part produced by an attention to detail sometimes perhaps too minute, though Mr. Roscoe adroitly avoids

wearying his readers. There is also a thought-compelling chapter on the changes—not all for the good—produced in Buganda by thirty years of missionary effort and European rule; a subject upon which as an ex-missionary in Uganda Mr. Roscoe writes with authority. Those who remember well the stormy times of Kabarega of Unyoro will be glad to read the particulars given by the author in chapter vii. about that valiant and perhaps misunderstood heathen warrior, now an old man, an exile, and a convert to Christianity.

On one point the general reader may justly complain that he is being misled. It is hardly fair of Mr. Roscoe to talk of the Luenzori mountains without giving a hint that he is referring to Ruwenzori. F. R. C.

Wild Bush Tribes of Tropical Africa.— G. Cyril Claridge. Pp. 314. *Illustrations and Map.* London: Seeley, Service & Co. 1922. 21*s. net.*

The bush tribes described by Mr. Claridge are those of Northern Angola, from the Congo river in the north to St. Paul de Loanda in the south—and chiefly those tribes who live within the bounds of the ancient kingdom of Kongo. The author writes with the experience gained by twelve years' residence among and a careful study of these primitive peoples, who in several respects have been but slightly affected by their contact with Europeans. He gives an excellent picture both of the country and its inhabitants. The chapter on Portuguese present-day methods is painful reading. It depicts abuses which, it is understood, the newly appointed High Commissioner for Angola is now endeavouring to remove. Little is omitted in this account of the Bacongo folk, so that we get a good working knowledge of their daily life, whether at home, in the field, out hunting or fishing, weaving cloth, story-telling or expressing themselves through the medium of music. But the most informative chapters deal with secret societies and fetish; attention may be particularly directed to the full description of what seems to be a unique death and resurrection society, and to the account of the *nkamba* fetish, which deals with the state and relationship of motherhood and infancy.

The author would do well to avoid the impressionist style adopted, especially in the two first chapters, and he should revise sentences such as this: "At Pontierville (*sic*) we steamed alongside a river of even great romance than the Congo; the Lualaba." Nor is it desirable to disguise Dakar under the spelling "Dacca," though the sound may be nearly the same. When he gets to his subject proper Mr. Claridge is however, as has been indicated, on safe ground, and he has done good service by the light he has thrown on the manners, customs, and beliefs of the natives of a little-known part of tropical Africa. F. R. C.

AMERICA

Source Book for the Economic Geography of North America — C. C. Colby. The University of Chicago Press. 1921. Pp. xii. and 418. *Maps.* 26*s. net.*

In this book the author does not attempt to write an economic geography of North America, but by means of chapters derived from various sources, government reports, magazines, scientific journals, etc., to present authoritative material bearing on the subject. Most of this material originally was widely scattered, not infrequently in volumes of other than geographical significance. Its collection in a single volume is bound to be very useful to students, and will help to introduce them to trustworthy sources of information. Treatment of this sort is far from exhaustive, but the volume might have been made

more useful if the net had been thrown wider. Thus, for instance, there are no chapters on the Negro problem or immigration to the United States, both subjects of great importance in the study of economic geography. A few of the chapters have been specially written for the book, notably an excellent one by Miss A. Foster on the principal Geographic Divisions of Mexico. Incidentally it may be noted that the chapter on Mexican Railways is rather inadequate, but on the whole the section on Mexican Geography is one of the best in the book. There are a number of black and white sketch-maps and a good index. The bibliographical references might well be more numerous in a book of this kind. R. N. R. B.

Working North from Patagonia.— H. A. Franck. London: T. Fisher Unwin. 1921. Pp. 650. *Illustrations and Maps.* 25*s. net.*

In this volume Mr. Franck has given us another narrative full of interest and shrewd comment. It recounts many months of wandering in South America from the Argentine and Chile through Uruguay, Brazil, and the Guianas to Venezuela, and is a continuation to a former volume entitled 'Vagabonding down the Andes,' which ranged from Panama to Buenos Aires. Mr. Franck is not a pioneer, even if he frequently wanders from the great routes. His journeys take him to civilized and often well-known lands, but that does not detract from the value of his books. He has a happy knack of noting little things and trifling incidents which give colour and life to his descriptions, and he is never tedious, however much he has to say about the places he visits. For instance, his chapters on Buenos Aires and Rio de Janeiro are alive with interest, and show these great cities as they really are. Among the less-frequented corners of South America Mr. Franck visited the three Guianas, and his comparisons between British, French, and Dutch administrations are well worth reading. The book is full of human interest, and despite its length, has not a dull page. It is packed with the raw material of geography, and it is as good a substitute for travel as one can hope to find. An index would greatly enhance its value. The numerous illustrations are well chosen. R. N. R. B.

AUSTRALASIA AND PACIFIC ISLANDS

The Discovery of the Hawaiian Islands.— E. W. Dahlgren. (*Kungl. Svenska Vetenskapsakademiens Handlingar*, Band 57, No. 4.) Stockholm: Almqvist & Wiksell. 1916.

In the title of this stately volume of more than 200 pages (4to, 19 × 10 inches), modestly termed by the author an "essay," Dr. Dahlgren propounds the question, "Were the Hawaiian Islands visited by the Spaniards before their discovery by Captain Cook?" The theory, first publicly enunciated by the Comte de la Pérouse, that a cluster of islands laid down between the latitudes of 19° and 21° N. upon old Spanish charts really represented the Hawaiian group, is here critically examined; and a digest of the evidence is presented with Dr. Dahlgren's characteristic thoroughness and impartiality. The work is well printed in English and illustrated by six nicely reproduced charts, in addition to twenty-seven map sections in the text. One of the former is a particularly interesting chart of the Northern Pacific Ocean, dated 1641, drawn at Lisbon by Antonio Sanches (from Spanish sources, no doubt), the original of which is in the Royal Library at The Hague. Another, also of the Northern Pacific, is from the library of the Royal Academy of Science at Stockholm, but is of much later date, and without direct evidence of authorship or provenance. Short accounts of nearly all the voyages performed by

the Spanish galleons and pataches between Manila and the Mexican ports from 1566 until the capture of the *Covadonga* by Commodore Anson in 1743, supply information not readily accessible in a collected form elsewhere. From his study of these abstracts, and the still earlier records from Magellan's time to Urdaneta's, Dr. Dahlgren concludes that they supply no hint of any discovery of the Hawaiian Islands by Spaniards. As to the popular supposition that Juan Gaëtan or any other navigators between 1527 and 1584 saw one or more islands of the group, the author regards it as untenable, in fact, "demonstrably incorrect."

In chapter viii. the evidence of the available *derroteros* or sailing directions written in the seventeenth and eighteenth centuries is proved to be entirely negative; but not many are preserved, at any rate in Europe. In chapter ix. attention is given to the various traditions related by trustworthy Hawaiian natives of foreigners having appeared among them in time past, and to the attempts made to correlate such stories with the legendary genealogy of Hawaiian chiefs' families; but Dr. Dahlgren considers that "they provide no certain foundation for any 'prehistoric' intercourse between Hawaiians and Europeans." As regards Europeans, he is probably right; but some critics may think that he has passed too lightly over the early canoe voyages performed by other Polynesian wanderers, notably those undertaken by Tahitian *tahu'a* and *fa'atere* in remote times and related in their sagas. Several of these have been brought to light by members of the Polynesian Society of New Zealand; it is often difficult, however, to invest such communications with geographical definition.

The occurrence of iron fragments among the natives at Kauai, observed by Captain Cook himself, can readily be explained by their having been acquired from flotsam wreckage or jettisoned casks, etc.; and the case of a Japanese junk having drifted on to the northern coast of Oahu in 1832, with four of her crew still alive, is recorded by Sheldon Dibble.

Some interesting facts are presented with regard to the Spanish name *la Mesa*, alleged to have been given to Hawaii itself in reference to the dome-shaped plateau of Mauna loa. Dr. Dahlgren contends that this is a simple error of transcription, and that, wherever the island in question really lay, the name originally applied to it was *la Mira*. This he traces back to Bernardo de la Torre in 1543, and identifies with one of the Bonin Islands; while the names *Los Monges*, *la Vecina*, and *la Desgraciada*, which were at some time transferred to these islands, derive, he considers, from the northernmost of the Ladrones discovered by Gonzalo Gomez de Espinosa in 1522.

The subject is carefully threshed out in all its aspects, with the net result that "No historical fact proves, nor is there any sort of probability, that the Hawaiian Islands were ever visited, or even seen, by the Spaniards, before their discovery by Captain Cook in 1778." It is certainly remarkable that, if the Spanish voyagers did first find so large and elevated an island, or group of islands, as Hawaii, (1) they should not have taken an early opportunity of exploring the new lands for gold or silver deposits; that (2) they did not claim them for their sovereign, by divine right and the treaty of Tordesillas; and that (3) they did not establish or attempt to establish a military settlement or post at some point on one or other of the islands, of which unmistakable historical and archæological traces would have remained. All these things were done or ordered by Peruvian viceroys in the South Pacific, and would have been done or attempted by the Mexican and Philippine governments in the North Pacific, at the Hawaiian Islands as at the Ladrones. The treatise

is provided with an index, table of contents, and list of maps, charts, and plates; and it is worthy of mention that, although it was printed at Stockholm, a careful perusal of it from beginning to end has revealed only one typographical slip, namely "is" for "it" (p. 105). B. G. C.

GENERAL

The Statesman's Year Book, 1922.— Edited by **Sir John Scott Keltie, LL.D.**, and **M. Epstein, M.A., Ph.D.** London: Macmillan & Co. 1922. *Maps.* 20*s. net.*

This is the fifty-ninth annual issue of this invaluable book of reference, and the forty-third under the general direction of the principal editor. It continues to grow in extent, the present issue being fourteen pages longer than its predecessor, and the additions as in previous years show the same sound judgment in supplying exactly what the public for whom the work is intended are likely to want, and that with a clearness and compactness that cannot be too much admired. The new maps this year are one showing the partition made between Germany and Poland of Upper Silesia by the Council of the League of Nations in October 1921, and the other showing the area of Western Hungary known as the Burgenland! transferred to Austria under the Treaty of Trianon, and distinguishing the part (Sopron or Oedenburg) ultimately retained by Hungary in accordance with a plebiscite held on 17 December 1921, under a subsequent agreement signed by Austria and Hungary at Venice. In the text the most extensive revisions and additions have been made under Russia and China. Under Russia the section on Instruction has been for the most part rewritten, and contains statistical information coming down to November 1921. That on Production and Industry is also in a large measure new, and furnishes some instructive comparisons of the production of minerals, manufactures, and agricultural products, and of the acreage under the leading crops, in 1913 and 1920, and of the numbers of live stock in 1916 and 1920. Some account is given of the new economic policy of the central government followed since March 1921, but under Money nothing is said on the slippery subject of paper currency. Under China considerable extensions have been made in the sections on Instruction, Production and Industry, Internal Communications, and Money and Credit. In that on Instruction the most recent available information as to the provision of university education is given, and there too we learn that the new phonetic script for the Chinese language is now being taught in the primary and "higher primary" schools. Under Money and Credit there is a paragraph on the steps taken with a view to the establishment of a standardized dollar. We also get an account of the arrangement made between China and Japan at the Washington Conference of 1921–22, and of the measures adopted at the same conference "to stabilize conditions in the Far East." The introductory matter includes among other things further particulars with regard to this conference, the terms of the Treaty between Great Britain and Ireland under which the Irish Free State was established, and an account of the Irish Free State, the position in Northern Ireland, the organization of the League of Nations, and the International Labour Organization. The editors have been able to incorporate in the present issue a large number of new census results. G. G. C.

Shooting Trips in Europe and Algeria.— **H. P. Highton.** London: H. F. & G. Witherby. 1921. Pp. 237. *Illustrations.* 16*s. net.*

This is a rambling record of chamois hunting in the Alps, elk and reindeer stalking in Norway, and shooting in Corsica and Algeria. The author, a

Rugby schoolmaster, found himself in the fortunate position of being able to indulge in his favourite hobby of game hunting as often as three times a year. He made the most of his opportunities, and even if his book has little of geographical value, it will be of interest to those who find an appeal in the sport of hunting. Others might find the killing a little monotonous were it not for the author's enthusiasm for wild places and the many little touches of humour and studies of mankind which relieve the tales of the chase. A little more attention to the spelling of some names would not have been amiss: Gottenburg and Throndhjem do not look well. The hints on outfit and equipment by so experienced a traveller should certainly prove useful to those who aspire to follow in his footsteps. R. N. R. B.

Wanderings of a Naturalist.— Seton Gordon, F.Z.S. London: Cassell. 1921. Pp. xiv. and 220. *Illustrations.* 15*s. net.*

This volume contains a series of essays contributed by Mr. Gordon, as occasion served, to various newspapers and periodicals, and now republished as a book. The author's wanderings are confined almost exclusively to the British Isles, and were undertaken mainly for the purpose of investigating the nesting sites and studying the habits of those of our birds which choose unfrequented localities in which to rear their young. The volume can hardly be considered a contribution to geographical science, although it contains "descriptions of the Northumbrian coast in winter, the Aran Islands west of the Irish coast, and a hill pass of the Pyrenees," yet it will be an acceptable addition to the ornithologist's library. It is illustrated by a number of very excellent photographs.

THE MONTHLY RECORD

EUROPE

Inland Navigation in North Italy.

ALTHOUGH in ancient times Italy led the way in developing works for inland navigation, she has somewhat lagged behind in modern times, and stands low among the European countries for the extent of inland waterways. This is largely due to the physical conditions of the country, which possesses few navigable rivers or rivers capable of canalization, but has, in the north at least, unusual advantages in the abundant water supply brought down by the Alpine rivers and the presence of natural reservoirs in which the supply can be stored for use when most needed. Of late years a serious attempt has been made to recover lost ground, and many projects have been set on foot both for improving the navigation of the Po and supplementing it by canals. It has been recognized that not only does the future of inland navigation in the plain of the Po depend on the perennial water supply from the Alps (that yielded by the streams from the Apennines on the other side of the basin being precarious and intermittent), but that the more the main line of water transport is displaced towards the northern edge of the plain the greater do the advantages offered become. Thus in course of time the idea of using the Po itself to any great extent has been given up, in view of the unstable character of the river-bed and the risks due to floods, and the idea has gained ground of a trunk system of canals joining Lake Maggiore with the Adriatic and serving all the most intensely industrialized areas of northern Italy, besides affording a new means of approach to Switzerland from Venice, which might thus compete with the ports

of Western Europe for the Swiss trade with the Levant and the East generally. Studies of various schemes have been made in the districts interested, and last August a conference met at Bergamo to discuss the whole question, a report of the proceedings of which has lately been received. It records the unanimous passing of resolutions approving certain proposals of the Comitato Bergamasco-Bresciano and urging on the Central Government the importance of taking these into consideration before proceeding to any action not in harmony with them. Two special reports adopted by the Conference are printed in full, the one by the engineer Luigi de Grossi, summarizing the history of interior navigation schemes for North Italy and describing in detail the proposals now to the fore; the other by the well-known geographer, L. F. de Magistris, explaining the geographic-economic factors which govern the decisions arrived at. A map is added showing the course laid down for the several sections of the proposed canal system, which have been so arranged as to combine into a harmonious whole while meeting the requirements of the districts concerned. They include a canal from Turin to Milan, with a branch connecting with Lake Maggiore; another from Milan to Lecco and the Lake of Como; and a third from Milan through the Bergamo-Brescia district to the upper Mincio, with connections with the lakes of Iseo and Garda. By adopting a fairly high-level course for the middle section the industrial area will best be served, the line will be brought conveniently near the lake sources of water supply, and the most suitable junction with the other sections will be provided for.

ASIA

The Navigation of the Tigris above Baghdad.

In his paper read to the Society on April 3 (*Journal*, July 1922, p. 20), Commander Elwell-Sutton referred to the story that a small vessel, the *Comet*, had reached Mosul from Baghdad, but said that no account of the voyage was on record.* Since reading the paper the author has made inquiries at the India Office and has received from the Under-Secretary of State the following information: In 1885 the *Comet* proceeded with the then British Resident at Baghdad, Mr. Plowden, on a tour of the Upper Tigris, in the course of which she reached on May 1 a point seven hours' steaming above Tikrit, and then at Waushansh she stranded and remained stranded for over a month. In 1894 Colonel Mockler, then Resident at Baghdad, proceeded in the same vessel to Samarra to investigate a disturbance by which British Indian subjects were put in danger. It has not been possible to find any record of the *Comet* having gone so far as Mosul at any time.

It seems probable, therefore, that the story is a myth, of which the origin was Mr. Plowden's voyage. He seems to have reached about the same place as did Lieut. Jones in 1846. The author of the paper and this Society are indebted to the India Office for their good offices in searching the records for these interesting facts.

A Proposed Journey across Eastern Tibet.

Brigadier-General George Pereira, who has for some time been travelling in the far interior of China, writes to us from Tangar, in western Kansu, under date 19 April 1922, giving some details as to his proposed journey southward

* The *Comet* was a small armed steamer specially built by the East India Company for the navigation of the Tigris, on the lower course of which it had plied for a good many years before the dates mentioned (see "Journeyings in Mesopotamia," by Lieut. C. R. Low, in *Illustrated Travels*, vol. I, [1869]).

through eastern Tibet to Yunnan. He had got together the needed mules and stores for the journey and hoped to start in about three weeks, accompanying a party of soldiers to Jyekundo. His further route would depend on circumstances, but he hoped eventually to work his way down to Yunnan City. He gives a distressing account of the present conditions in most of the interior provinces, each of which has its own factions and other disturbing elements, brigandage being rife in many parts. Kansu was, however, in a better plight than some other provinces, such as Szechwan, where conditions have been particularly bad. In Kansu the Mohammedans, after a long period of repression, have to a large extent shaken off the Chinese yoke, and are repaying the cruelties so long inflicted upon them by their oppressors. They are probably better armed than the Chinese, and being born fighters, are likely to hold the position they have gained for a long time to come, if not to subdue the areas in the centre, east, and south-east still held by the Chinese, who are hopelessly divided. Even the Mohammedans are not united, some still adhering to the Koran, while new sects have arisen which hold to later traditions, or even incorporate a mixture of Christianity and Buddhism.

AMERICA

Gorge of the Alsek in the Southern Yukon.

The tendency for mountain ranges such as the Himalayas to be cut through by deep gorges just where the crest of the range is highest, to which Sir S. Burrard referred in his paper printed in the *Journal* for September 1921, finds an illustration in the Yukon Territory, to which attention is called by Mr. W. P. S. Jones, in a letter addressed to us from British Columbia. The Alsek river, which gives its name to a district of the Yukon, rises in Lake Frederick, one of the maze of lakes which lie at the head of the Yukon, and, after a circuitous course to the north and west, turns south and breaks through the mountains, having the Dalton range on the east and the massif of Mount Dean on the west. The latter is a beautiful snow peak nearly 10,000 feet high, and quite the most prominent feature of the neighbourhood. It must be remembered however that many transverse valleys exist where the ranges in which they occur show no such striking elevations, and that both the deep gorges and great elevations are due to the relatively small advance there made in the cycle of erosion. Mr. Jones mentions as a curious fact that while a tributary of the Alsek swarms with salmon, its own upper reaches contain none. The Alsek district is easily accessible by the waggon road from White Horse (the capital of South Yukon) to Kluane lake, the centre of a scattered mining area, to which there is a monthly mail service.

The Fault-troughs of the Antilles.

The question of the origin of great longitudinal depressions like the African "rift-valleys" is one of the most interesting of those concerned with the major topography of the Earth, and all studies tending to throw light on it are to be welcomed. In one such, lately published in the *Journal of Geology* (February–March 1922), Mr. Stephen Taber sums up our present knowledge of the Great Fault-troughs of the Antilles, which he had already touched upon in previous papers in 1920. The main tectonic trend in the Antilles is approximately east and west, along arcs convex to the north, in part following the margins of the great trough-like depressions dealt with in the paper, the most important of which are the "Bartlett" trough running from the head of the Gulf of Honduras to the southern end of Cuba, and the "Brownson" trough running out into the

Atlantic north of Porto Rico. These arcs cut directly across the earlier tectonic lines and are everywhere marked by extremely steep slopes. Mr. Taber brings together evidence tending to show that the east-west arcs are zones of normal faulting developed in late geologic time, to which the formation of the great troughs is to be ascribed, and that the displacements are continuing to the present time. The supposed fault-scarps are mostly below sea-level, but for this reason they have been protected from erosion, and present the following characteristics indicating an origin through faulting : (1) great height ; (2) precipitous slopes; (3) abrupt changes in slope above and below ; (4) rectilinear course ; (5) subordinate depressions and elevations near the base of the main scarps. The floors are relatively flat, and instead of being graded like river-valleys, rise and fall throughout their length ; many of the deepest places are close to the bounding scarps, instead of near the centres of the troughs ; and the troughs are parallel rather than convergent, being in places roughly arranged *en échelon*. Mr. Taber considers that they must be attributed to the subsidence of long narrow blocks rather than to elevation of the areas on each side, and that normal rather than thrust-faulting is indicated by the absence of lateral pressure effects. As suggested by Vaughan, the faulting may date from the Pliocene, but the frequent occurrence of earthquakes proves that displacements are still continuing, and their accompaniment by sea-waves indicates that most of these recent displacements have, like the old ones, been vertical. Collectively the fault zones described form a great system extending from the eastern end of the Brownson trough westward to the Gulf of Honduras, and whether or not it is continued into central America it forms one of the major structural features of the Earth. The phenomena seem in the writer's opinion to testify to a state of tension rather than compression in the crust, such tension being possibly due to warping caused by an upswelling or arching of the region together with some subsidence on its borders. The older structural directions, it should be noted, have little relation to present topography. They appear to be chiefly due to folding.

AUSTRALASIA AND PACIFIC ISLANDS

Changes in the Front of the Franz Josef Glacier.

Reference was made in the *Journal*, vol. 38, p. 207, to the careful examination of the Franz Josef glacier, largest but one of all the glaciers in the Alps of New Zealand, by Dr. J. M. Bell and Mr. J. M. Clarke, the results of which had been published in a memoir issued by the New Zealand Geological Survey. During the survey pegs were placed along the line marking the face of the glacier, so that its subsequent movements might be accurately determined. Observations by Mr. A. Graham, guide at the glacier, which were published by Mr. R. Speight in 1914, showed that some changes had taken place in the intervening five years, and further observations made by Mr. Speight with Mr. Graham's assistance have brought to light a considerable retreat since 1909, though some signs of a renewed advance are noticeable (*Trans. and Proc .N.Z. Institute*, vol. 53, p. 53, 1921). Measurements of the distances intervening between Dr. Bell's pegs and the face in 1921 were somewhat impeded by the extensive pools which have formed in front of the glacier, but it was established that the minimum retreat since 1909 has been 100 metres, the maximum 456 metres, and the average approximately 180 metres. It was found that the principal part of the Waiho river ran from the eastern side of the glacier, the solid barrier of rocks fronting the western part—evidently the remains of the spur of a pre-glacial valley—having caused the stream to dis-

charge where the lip of the obstruction is lower. Between these rocks and the face of the glacier are the ponds. The signs of impending advance consist in a strongly marked wave or "pulse" developed about half a mile up the glacier, and the push of the ice over the moss-covered surfaces of the valley-walls still higher up. According to Dr. Bell's estimate of the rate of motion —1 foot to 2 feet per day—this pulse should reach the terminal face in from three to five years; but Mr. Graham's observations indicate an average rate of 3 feet per day during two hundred days. A great thickness of ice appears to lie behind the rock-bar above mentioned, so that if a further retreat should take place, the lake along the face will probably increase in size, suggesting a usual occurrence when a glacier retreats from a rock-bar. Only slight abrasion and no great erosion was noted on the recently exposed rock surfaces. The alternation of ice-falls with more gently sloping surfaces suggests that a characteristic series of valley steps would be displayed were the ice removed.

ANTARCTIC

The Protection of the Elephant Seal.

At the request of Sir Sidney Harmer, Director of the Natural History Museum, we publish the following appeal, which should receive the most sympathetic attention:

"The Elephant Seal, or Sea Elephant, of the far south is an animal of unusual interest, whose continued existence is a matter of anxiety to Zoologists and other lovers of Nature. The old males of this magnificent species reach a length of at least 20 feet, the females being much smaller; and they are thus the largest members of their group, which includes the Seals proper, the Sea-lions, and the Walrus. Although not producing fur of commercial value, they have been extensively hunted for the sake of the oil contained in their thick blubber.

"At Macquarie Island and the Crozet Islands their numbers have been reduced to such an extent as to suggest the probable extermination of the species, but they continue to exist in considerable numbers off South Georgia, where they are protected by legislation approved by the Colonial Office.

"It is extremely unlikely that the Elephant Seal will continue to exist if it does not continue to receive adequate protection. A report recently published, that a vessel belonging to a well-known Antarctic Expedition had replenished the fuel for the ship's engines by killing all the available Elephant Seals for the sake of the oil contained in their blubber, thus gives rise to some anxiety. I do not wish to be understood to criticize unfavourably this particular incident, since it must be allowed that a party in serious danger owing to the want of fuel must take any steps they can in order to secure their own safety There is a danger, however, that a vessel about to proceed to Antarctic latitudes might deliberately economize its coal-supply, on the assumption that it would be able to obtain fuel from Elephant Seals on arrival at its destination. It is most undesirable that anything of this sort should be allowed. The Trustees of the British Museum, to whose notice the matter has been brought, have thought it advisable to pass a Resolution deploring this practice, and expressing the hope that it will be avoided in future expeditions over which they may be able to exert any influence. Some of the readers of the *Journal* who are not acquainted with the animals under consideration may be able to inspect the series shown in the Lower Mammal Gallery at the British Museum (Natural History). They will hardly leave the Museum without having their sympathies

enlisted on the side of the Elephant Seal, or without coming to the conclusion that every effort should be made to ensure the safety of this animal, which occupies a position in Antarctic Seas much like that of the Walrus in the north.

"S. F. HARMER.

"19 July 1922."

MATHEMATICAL AND PHYSICAL GEOGRAPHY

Evaporation from Large Water Surfaces.

The importance of a knowledge of the factors governing the rate of evaporation from water areas and of the diffusion of vapour in the atmosphere is obvious, but the problem of calculating the upward movement of aqueous vapour in a current of air of specified conditions is one of great complexity. This mathematical problem has recently been attacked by Mr. M. A. Giblett with striking results, which have appeared in the *Proceedings of the Royal Society* (A, vol. 99, 1921) under the title "Some Problems of Evaporation from Large Expanses of Water." Basing the investigation on the empirical evaporation formula of Dalton, the writer shows how the process of diffusion and the resulting distribution of vapour in the atmosphere is controlled by eddy-action or turbulence as previously investigated by G. I. Taylor. In a beautiful series of curves there is demonstrated, for instance, the mean amount of water-vapour that would be evaporated from a certain stretch of a region like the North Sea at a certain temperature by a wind of certain velocity and initial humidity, given a certain value for the coefficient of eddy-diffusivity denoting turbulence, together with the amount of rain that could be produced if the evaporated water were precipitated instantaneously. The significance of this type of quantitative work in practical meteorological or climatological questions need not be insisted on, particularly in regard to schemes for increasing rainfall in dry countries, which have lately come to the fore but have been judged by meteorologists mainly from a qualitative point of view (see *Journ.*, vols. 57, p. 166, and 59, p. 474). From a geographical standpoint Giblett's results derive peculiar interest from the fact, indicated by the author himself, that they corroborate Sir John Murray's estimate that only about four-ninths, or roughly one-third, of the rainfall over the land-surface of the globe finds its way into the oceans by rivers, a fraction which must be the excess of evaporation above precipitation over the sea (see *Scottish Geog. Mag.*, Feb. 1887). The wider implications of this conclusion might be expressed in the statement that whereas the maintenance of land-waters depends absolutely upon rainfall—a fundamental truth of physical geography—and will inevitably cease if the rainfall fails either permanently, seasonally, or irregularly over limited portions of the globe, yet such is the intricate balance between the complementary processes of evaporation and condensation over the globe as a whole that land-waters furnish two-thirds of the supply required to replenish their own loss through drainage into the sea or evaporation into the atmosphere, if we neglect the trifling proportion that may disappear permanently from the cycle in the crust of the Earth.

Ocean Depths.

The results of long and tedious work on the depths of the ocean were brought out last year by Dr. E. Kossina as Part 9 of the *Veröffentlichungen* of the Berlin Oceanographical Institute, and are summarized and discussed by Dr. G. Schott of the Deutsche Seewarte in the *Annalen der Hydrographie*, Part 2, 1922. In undertaking a new calculation both of the mean depths

of the ocean and its several parts, Dr. Kossina has built upon the foundation laid by Dr. Groll (killed during the war), whose bathymetrical maps of the oceans on an equal-area projection appeared in 1912. Even since that date research has yielded new results, both as regards the depths ascertained by sounding and the precise lines of partition between sea and land, and due account of these has been taken by Dr. Kossina. Among them the unexpected discovery of the Emperor Nicholas Land in the Arctic Ocean, the improved knowledge of the contours of the Antarctic continent, and the virtual expunging from the map of the supposed Antarctic plateau encircling the world, are perhaps the most important. It has also been necessary to adopt a precise delimitation of the several subdivisions of the ocean, in which Dr. Kossina differs to some extent from his predecessors. For the determination of the areas of the various contour intervals he has adopted the laborious method of counting the number of square millimetres falling to each on charts printed on squared paper. The necessity of so precise a calculation is questioned by Dr. Schott, who points out that for something like three-fourths of the whole area of the oceans the probable error due to the uncertain position of the contour-lines is far greater than that likely to be introduced by measurement with the planimeter. The latter method might have been used in the majority of cases, the actual counting of squares being reserved for the smaller and more intricate subdivisions. A further consideration, dealt with by Kossina in an appendix only, is that owing to the curvature of the Earth's surface the actual areas at different depths are distinctly smaller than those calculated at mean sea-level. On the other hand, the adoption of the Helmert-Hayford Ellipsoid in place of that of Bessel would involve an addition of over 100,000 square kilometres to the total area of the ocean. The measurement was made by 5° zones, and the mean depth of the ocean obtained (1) by treating it as one area, (2) by summing the results for its separate parts, (3) by summing those for the 5° zones ; and the figures obtained were surprisingly in accord (3796, 3795, 3792 metres respectively). The calculation by 5° zones shows that in northern latitudes the greatest mean depth (4326 metres) lies between 30° and 25° N., in southern the maximum of 4322 metres lies between 55° and 60° S. From these latitudes the ocean floor rises gradually towards the equatorial zone, more steeply towards the Antarctic continent and the border of the Arctic region, to fall again steeply north to the Polar basin (named Nansen Sea by Dr. Kossina). A recalculation of the mean elevation of the land (as 840 $\pm$ 40 metres) permits the drawing of a general hypsographic curve for the whole surface, from which new values are obtained for the five broad gradations of relief defined by physical geographers.

Audibility of the Aurora.

Referring to Mr. Gathorne-Hardy's observations in his recent paper before the Society on his journey to northern Labrador (*Journal*, March 1922, p. 158), as to the apparent possibility of *hearing* "the Aurora, when in rapid movement, making a faint, crisp, rustling noise," a correspondent, Mr. J. C. Barber, writes from northern British Columbia, saying that he had frequently heard the sound thus described on the Canadian prairies. He had spent several years there as a night telegraphist on the Canadian Pacific Railway, and had noted that the sound could only be distinguished in the early hours of the morning and in very low temperature. In northern British Columbia, although temperatures as low as 60° below zero are sometimes experienced, the sound had never been heard, probably because atmospheric conditions are there not so

favourable. It would be of interest to discover what are the special conditions favourable to such audibility of the Aurora, and we hope that further observations on the subject may be forthcoming.

International Congress at Marseilles.

In connection with the National Colonial Exhibition to be held in September at Marseilles, a "Semaine Internationale" has been organized for the purpose of bringing together geographers, explorers, ethnologists and naturalists, whether French or of other nations, who are in sympathy with French colonial achievements. The programme will include visits under suitable guidance to the exhibition galleries, public lectures and technical meetings, social functions and geographical excursions, and the Congress, which is presided over by Prince Bonaparte, will last from the 22nd to the 28th of September. The charge for tickets of membership is 25 francs, and those attending will be able to travel for half-fares on the system of the Paris–Lyon–Mediterranean Railway. Communications are to be addressed 5, Rue Noailles, Marseilles.

OBITUARY

Sir Lewis Beaumont.

WITH the death of Admiral Sir Lewis Anthony Beaumont, G.C.B., K.C.M.G., at the age of seventy-five, there is severed one of the last links connecting the Polar explorers of the present day with that past epoch which terminated with the despatch of the *Alert* and *Discovery*, bound for the North Pole, in 1875—an expedition which, from the geographical point of view, is both memorable and associated with a certain feeling of regret, in that it constituted the last of the purely naval expeditions sent out by this country for the purpose of Polar exploration.

Born in 1847, Admiral Beaumont entered the service in 1860, and was appointed first lieutenant of H.M.S. *Discovery*, Captain Henry F. Stephenson, early in 1875. The expedition, under the command of Captain (afterwards Vice-Admiral Sir) George Nares, left England on May 29 in that year, and the *Discovery* wintered at Discovery harbour in Grinnell Land, the *Alert* proceeding to Floeberg beach, some distance northward. Next spring a sledging party from the *Discovery*, under Beaumont, set out eastwards to explore the northern coast of Greenland. Their work was seriously hampered by an outbreak of scurvy, and a number of the party had to be sent back to the ship, one of whom died *en route*. Beaumont, however, with six men pushed on, and succeeded in reaching the eastern shore of Sherard Osborn Fiord, in 82° 20′ N., 51° W. Several of his men were already enfeebled by scurvy, and for the greater part of the return journey two of them were completely broken down, and had to be dragged upon the sledges, while two more were unable to do more than hobble, so that the labour of pulling devolved entirely upon Beaumont and two seamen, Gray and Jones. The leader's fortitude and endurance were of inestimable value to his party, but it would have gone hard with them had it not been for a providential meeting with a relief party who had set out in search of them. Beaumont and his two coadjutors were met with dragging forward their helpless companions, lashed on top of the sledge, two at a time, thankful if they advanced as much as half a mile a day. The

leader himself admitted that their strength would not have been equal to one more day of such labour.

On the expedition's return in 1876 Beaumont was promoted to Commander, and took no further part in exploration. His later career was brilliantly successful. In the intervals of service afloat, he was Naval Attaché for Europe in 1882, private secretary to the First Lord (the Earl of Northbrook) from 1883 to 1885, and Director of Naval Intelligence from 1894 to 1899.

He reached flag rank in 1897, and was Commander-in-Chief of the Pacific station from 1899 to 1900, and of the Australian from 1901 to 1903, having been specially appointed to the latter station in order that he might escort T.R.H. the Duke and Duchess of York in the Australian portion of their world-tour.

He next served with marked ability and discretion as British regresentative upon the International Commission appointed to investigate the "Dogger Bank Incident" of 1904. In connection with this inquiry, it is interesting to recall that when an English translation of Commdr. Vladimir Semenoff's book 'Rasplata' (The Reckoning), giving an account of the voyage of Rozhdestvensky's ill-fated fleet, appeared some years later, the "Translator's Preface" was signed with the initials "L. A. B.," and the authorship of the translation was, in consequence, widely ascribed to Admiral Beaumont, an honour which he was at some pains to disavow. It was actually due to the late Prince Louis of Battenberg. His final service was as Commander-in-Chief, Devonport, a post which he held from 1905 to 1908, being promoted to Admiral in 1906.

Sir Lewis was one of the naval A.D.C.'s to Her Majesty Queen Victoria from 1895 until reaching flag rank in 1897, while in 1911 he became First and Principal A.D.C. to his Majesty, a post which he held until he retired from the active list in the following year. He was created K.C.M.G. in 1901, and K.C.B. in 1904. He was also a Grand Officer of the Legion of Honour.

Sir Lewis Beaumont's association with this Society was long and cordial. He became a Fellow in 1877, soon after the return of the Nares Expedition, and so soon as his professional duties allowed became a member of the Council, on which he served from 1903 to 1905, and again from 1908 to 1917. During four of those years (1909–13) he was a Vice-President. His excellent judgment and shrewd common sense were greatly valued by his colleagues, and his advice was freely sought and given on all matters connected with Polar exploration, in which, in spite of the pressure of official duties during the later part of his career, he always retained a very keen interest. This was shown during the war, when he was requested by the Admiralty to superintend the equipment of the *Discovery* for the purpose, in which she was eventually forestalled, of rescuing the crew of the wrecked *Endurance* from Elephant Island in the South Shetlands. R. T. G.

Dr. W. H. R. Rivers.

The sudden death on June 4 of Dr. W. H. R. Rivers, F.R.S., has inflicted an irreparable loss on the scientific world at large, as well as upon a host of those who were proud to call themselves his friends or pupils. Though no explorer in the geographical sense, exploration was the very essence of his life, and perhaps no man has ever approached the investigation of the human mind by so many routes. Psychologist, anthropologist, and physiologist, each of these disciplines was in turn brought to bear on his main purpose in life, the greater understanding of the human mind and of man's activities. But it was not only as recorder and investigator that his influence was felt; not a few

missionaries and Government officials in distant parts of the globe have, under Rivers' influence, exchanged their almost inevitable rôle of destroyer for that of sympathetic observer and recorder.

Rivers' early training was in clinical medicine: after taking the M.D. degree of London University, he migrated to Cambridge in 1893, where he became University Lecturer in Physiological and Experimental Psychology. In 1898 he went to Torres Straits as head of the psychological section of the Cambridge Anthropological Expedition. It was there while working on the senses that he conceived his genealogical method which has since become one of the corner-stones of sociological research. It is impossible here to follow his career in detail, but it may be mentioned that he became a Fellow of the Royal Society in 1908 and was awarded a Royal Medal in 1915, while at the time of his death he was president of the Royal Anthropological Institute. The appreciation and bibliography published in *Man* (July 1922) indicate the wide range of his activities and the volume of work he produced in the twin fields of psychology and anthropology. Each anthropological study, besides being a record, was an exposition of method of which he was a master. His greatest work, 'The History of Melanesian Society,' was published in 1914, but it was in 1911 at the meeting of the British Association at Portsmouth, in his presidential address to the Anthropological Section, that he first enunciated in detail those views on culture-contact that have given direction to so much anthropological research.

When war broke out he joined the R.A.M.C. and was able to apply his wide knowledge to the treatment of sufferers from shell-shock. Here again his genius for method was made manifest, and he was able to exercise a wholly beneficent influence, not only on his patients but later, as advisor to the Air Force, upon those engaged in organizing the medical service of the department.

I cannot finish this notice without a few words on Rivers the man. In spite of the enormous amount of work he produced and his travels in India and Melanesia, during which he was subject to the necessary discomforts of life off the beaten track, he was far from robust; indeed he recognized his physical limitations so acutely that for many years he seldom worked more than four hours a day. Another limitation, and one acknowledged by himself, was his almost entire lack of visual memory, yet he never allowed these drawbacks to dishearten him. Throughout life he kept the enthusiasm and interest of youth. It was this freshness of outlook added to his remarkable insight and erudition that made his personal appeal so great. Even those knowing him but slightly were influenced, while his old friends know that in their lifetime they will not meet his equal.

C. G. SELIGMAN.

S. Percy Smith.

We have received with regret the news of the death, on April 19 last, of Mr. Stephenson Percy Smith, an old and esteemed representative of this Society in Australasia, and well known both for his early survey work in New Zealand and for his contributions to our knowledge of the ethnology of that part of the world. He died at his home at New Plymouth at the advanced age of eighty-one years, and had been a Fellow of the Society since 1880. The following brief sketch of his life is based on notes kindly supplied by his friend Mr. James Cowan.

Mr. Percy Smith was born in Lincolnshire and went to New Zealand with his parents in 1849. The Smiths, with other families from Devon and Lincolnshire, were among the makers of the New Plymouth settlement. When only

fourteen he entered the Provincial Survey Office at New Plymouth, under Mr. Octavius Carrington, and soon took his share in work in the field, carried out in part under fire during the Maori disturbances previous to the rebellion of 1860. After five years in the Auckland district as government surveyor he returned to Taranaki, still in a distracted state, and carried out survey work, often attended with great risk from Maori ambushes, until after the end of the war in 1869. In 1874 he made a triangulation survey of the wonderful Rotorua–Taupo country, much of which he was the first to map, and in 1881, as chief surveyor of the Auckland district, laid out the government township of Rotorua. In 1886 he wrote a report on the eruption of Mount Tarawera, full of valuable information on matters geographical, geological, and ethnological. In the next year he carried out an important official mission to the Kermadec Islands, of which group he took possession in the name of the New Zealand Government, making the first detailed survey and describing the group in a useful report, illustrated by maps and views. Eventually he became head of the New Zealand Department of Lands and Survey, holding the appointment until his retirement from government service. In 1901 he spent four months on Niué, or Savage Island, as Government Resident, and framed a system of laws for the island, which he described in 1903 in a book entitled 'Niué-Fekai (Savage Island) and its People.'

Since the foundation of the Polynesian Society in 1892 Mr. Smith had been editor of the Society's *Journal*, the volumes of which form a mine of valuable information on the Maori and Polynesian race. From his earliest days in Taranaki he had known the Maori people intimately, and then laid the foundations of a friendship with their tribes which developed into a close and sympathetic study of their ancient history, traditions, folk-lore, and religious beliefs. The results so acquired were to a large extent made public in the Journal referred to, to which he was one of the largest contributors. His travels in other parts of the Pacific bore fruit in his book 'Hawaiki,' in which he brought together all the facts that are to be gleaned on the place of origin of the Maori. Much valuable information is also to be found in his other books, 'The Peopling of the North,' and 'Maori Wars of the Nineteenth Century,' and the best historical record of Taranaki yet written is given in his latest work, 'History and Traditions of the West Coast' (1911). For his long-continued work in ethnology the New Zealand Institute awarded him the Hector Medal for scientific research.

A man of great personal charm, Mr. Smith made many friends among visitors to New Zealand, and his reputation extended far beyond his own country.

MEETINGS: ROYAL GEOGRAPHICAL SOCIETY: SESSION 1921–1922

THE ANNIVERSARY DINNER

THE Anniversary Dinner of the Society was held at the Connaught Rooms on Tuesday, 30 May 1922, with the President, Lieut.-Colonel Sir Francis Younghusband, in the Chair.

After the loyal toasts had been honoured, the PRESIDENT, in proposing the Toast of "The Medallists," said: Your Excellency, My Lords, Ladies and Gentlemen, I very greatly regret that we have not present to-night the

President-elect, the Right Honourable Lord Ronaldshay, who was elected our new President yesterday. Unfortunately, he engaged before he left India to dine to-night at the Calcutta Annual Dinner. He very much regrets that he is not able to be with us this evening. We in this Society consider ourselves very fortunate that Lord Ronaldshay, who has travelled so much and written such interesting books and goes in so thoroughly for whatever he undertakes, has consented to be the President of the Society.

I now have to propose the toast of "The Medallists," and I do so with the very greatest pleasure, because I can speak on that subject from the point of view of a Medallist and as the President of this Society. Speaking from the point of view of those who have travelled, when we are making a journey I do not suppose we have in our minds the idea of winning a gold medal; but every traveller does have in mind the hope that as the result of his travels he may gain the esteem and honour that he deserves. That he has at the back of his mind to uphold him in hardships, difficulties, and dangers. Speaking from the point of view of the President of this Society, I can say how very fortunate and delightful a thing it is that by presenting a Medal we have a means of showing the esteem and honour in which we hold travellers who have carried out their work with distinction. This year the Patron's Medal, with the gracious approval of the King, is awarded to Colonel Howard-Bury. We are thankful that we had in our power this means of rendering our gratitude to him for the distinguished work that he has done for the Society. Colonel Howard-Bury will remember that it was two and a half years ago that he left London for India, soon after there had been a paper read before the Society on the approaches to Mount Everest by Captain Noel, who is one of the present members of the Mount Everest Expedition. It had, of course, been in our minds for a number of years that when the war was over an attempt should be made to reach the summit of the highest mountain in the world. I happened to meet Colonel Howard-Bury at luncheon a few days after the paper had been read, and we talked together over the idea of an expedition to Mount Everest. Colonel Howard-Bury had been in India and had travelled in Central Asia; he had also been on shooting expeditions in the Himalaya. He had left the Army and had leisure, and, what is more than leisure in matters of this kind, a sufficiency of means. Therefore we talked together over the idea of his going out to India on an expedition to Mount Everest; and when a few months afterwards this Society did me the honour of electing me as President we took the matter up seriously and joined with the Alpine Club, whose President we are delighted to see here this evening. We set about those very important preliminary preparations which are the necessary basis of an expedition to Tibet. There to hand was Colonel Howard-Bury, and he went out to negotiate for us with the Government of India. That was an exceedingly important preliminary step, the negotiations being carried out by Colonel Howard-Bury with conspicuous success. As a result we were able in the beginning of last year to get the consent of the Government of Tibet to grant facilities for reconnoitring the country, and we sent Colonel Howard-Bury and his party out in the spring of last year. You all know the wonderful success that attended his efforts and the information he brought back. Altogether he made a very complete reconnaissance of the mountain, and was able to tell precisely the way by which Mount Everest could be most satisfactorily tackled. They returned to this country at the beginning of November, and the whole of their results are available for you. They probably thought that when they returned they would be able to sit down in peace, but as soon as

they arrived they were told they would be expected to write a full account of their proceedings, which we might publish, in order that the expedition of this year, which is to make the full attempt to reach the summit, might have their results, and that the public might have full information and be able to follow the steps of this year's expedition. Colonel Howard-Bury and his colleagues set to work, and as a result Mr. Edward Arnold, whom we are delighted to have present this evening, was able to publish a most beautiful book containing delightful photographs which Colonel Howard-Bury and Mr. Wollaston took, with the maps of the Survey officers and of the geologist Dr. Heron. As a result you have, under a year from the time that the Everest Expedition started, the complete results published and in the hands of the public. For all that we are much indebted to Colonel Howard-Bury who led the Expedition. All who have been in those parts know the tact that is required in dealing with people like the Tibetans; the endurance and hardships one has to undergo owing to the extreme heat of the tropical forests of Sikkim and the extreme cold of the heights of the Himalaya. We are therefore delighted that we had in our hands this opportunity of conferring upon him the Gold Medal of our Society. We should like Mr. Wollaston, who is also present, to know that we esteem him no less.

Our second Royal Medallist is Mr. Ernest de Koven Leffingwell, whose work was carried out on the north coast of Alaska. For many years he made thorough, careful, and methodical surveys; it was not a sensational work, but it was well done at his own initiation, though now published in the Memoirs of the United States Geological Survey. When we informed Mr. Leffingwell that he had been awarded a Gold Medal of this Society, he wrote expressing his utmost gratification that work completed some years ago, and of which small notice had been taken in his own country, should have been recognized by us. Mr. Leffingwell is of British descent, but now an American subject, settled at Los Angeles in California. The Medal from this Society stimulated in him the affection he had always had for the Mother Country, and made him realize that the Society recognizes good work wherever done.

Our Victoria Medal has been awarded this year to Mr. Baddeley, who is very well known to many of you. I regret that he is detained in Italy by ill health. He has made most interesting journeys in Russia, in the Caucasus, in Siberia and along the Amur, and across that river into Manchuria. We have awarded him the Victoria Medal more especially on account of the great book that he has written on Russia, Mongolia, and China. It is a work of great learning and of much interest to students of the advance of Russia to the Pacific. We greatly regret that Mr. Baddeley is not present this evening. I now give you the health of "The Medallists," coupled with the name of Colonel Howard-Bury.

Colonel HOWARD-BURY, in responding to the toast of "The Medallists," said: I have before me to-night a harder task even than climbing Mount Everest, and that is responding on behalf of the Gold Medallists of the Royal Geographical Society. Unfortunately, two of the recipients are unable to be present, otherwise my task might have been lightened. Mr. Leffingwell is, I regret to say, in America. For eight years, with the exception of one small break, he spent most of his time by himself, or with only one white companion, away in the wilds of Alaska, where he made a very complete survey, not only of all that northern coast, but also of much of the interior. His persevering work carried on throughout all those years is one that has most certainly merited the award of the Patron's Medal. The other Medallist, Mr. Baddeley,

is unfortunately ill in Italy, but I hope the award of the Victoria Medal may be some consolation to him in his sickness. His study of the advance of Russia into Central Asia, during the 16th, 17th, and 18th centuries is most fascinating and a great monument to his toil and his labour in all those years.

I look upon the award to me of the Founder's Medal as an expression rather of thanks and of gratitude to all the members who took part in the Mount Everest Expedition of last year. Each had his own task. We had our two surveyors, Major Morshead and Major Wheeler. Major Wheeler, in his photographic survey, had often to undergo greater discomforts than any of us. He was by himself very often at heights of 18,000 and 20,000 feet. He would spend his day on the top of peaks waiting for the clouds to lift, in driving snow or hailstorms, expecting possibly a short break that might come in the clouds, and often spending a whole day without ever getting a glimpse of a mountain or being able to take a photograph. His work I look upon as the finest work that an officer of the Indian Survey could have undertaken. He was always cheerful and always ready to work, and his work was most valuable. Mr. Wollaston, whom we are glad to see with us to-night, was in charge of the natural history of the Expedition. We were in a country full of wonderful flowers, and he had great opportunities for collecting and for bringing back seeds and roots of flowers which I hope one of these days will adorn our gardens at home. He was able to find several new varieties of primulas and gentians, and to send back a few of these plants which, I believe, are flourishing and doing well in the Royal Horticultural Society's gardens. Dr. Kellas unfortunately we lost in the early days of the Expedition. His work would have been of the very greatest use to us. There were many problems of high altitudes that remained to be solved which he alone of us was capable of solving. He had the knowledge requisite for it, but, alas! he was taken from us, and it remains for another to carry out those experiments which he would so dearly have wished to make. We had with us Dr. Heron, the most indefatigable member of the party: the only member who remained shaven. We said that he employed his time in hunting for hot springs to find hot water for shaving, and that that was the reason of his very great activity. However, he has produced a very valuable geological survey of the whole of that region, which was unknown before. Our two Alpine climbers, Mr. Mallory and Mr. Bullock, did the finest work in finding a way on to Mount Everest. We were able to get no information of any kind from the Tibetans, and they had to explore every valley, and throughout the summer months they were much hindered by rain, mists, and snow. It was owing to their efforts that eventually, in September, a way was found which the present Expedition are taking, and which we hope will lead them direct to the summit.

Geography has, however, I might say, no country. Its disciples are those who love to roam in the world. They are taken from those who are always restless and always anxious to see unknown lands. They are not content with the ordinary highways; they want to go on to the byways and the unknown tracks in order to see what other people have not seen and to try and bring back something new, some further knowledge. This Expedition led us to those wonderful heights, heights where we seemed to be separated from and above the world, above vast seas of clouds in a higher sphere. Below the clouds it was all darkness; the wickedness of the world seemed to be left below, and we stood on heights far away above the world. And on those heights, I am sure it was almost a vision that seemed to come to us, and for the good of our souls; we have seen a vision which those who remain below cannot see. It is only by

going to those lofty heights and separating yourselves completely from the world that you can obtain those wonderful visions in that most beautiful atmosphere and amid those magnificent surroundings. It is hard to describe it, and it is a long journey from London to those heights; but one has come back here to London, and to one's own country, to find it full of strife and almost civil war. I often wonder whether, if we were to go back to the days of early civilization—or even to the mediæval ages in Tibet—whether the people then were not altogether happier than we are. They have no newspapers, no telephones, no telegraphs. They do not know what the blessings of modern civilization bring. They may have but one bath in the year, but their sense of smell is not acute. And why should not they be all the happier for it? We come back again to the ordered life of civilization, but we have had a glimpse of the mediæval ages of Tibet, a glimpse which we shall never forget. Well, ladies and gentlemen, I am keeping you too long. I thank you very much indeed for the kind way in which you have welcomed me to-night.

Sir MAURICE DE BUNSEN, in proposing the toast of "The Guests," said: The agreeable task falls to me this evening of proposing to you the toast of "The Guests." I will begin by saying that it gives us great pleasure to see here this evening the Dean of Westminster. He is known to all of us, and a welcome guest wherever he goes. The great Abbey, of which he is guardian, contains the monuments and memorials of the great men of this country: of great explorers and travellers. I remember not very long ago I had the privilege of going with others of this Society to lay a wreath on the grave of Hakluyt. It was not very clearly known where the grave was, but we were able to hang our wreath on a column which is believed to be near it. I do not know if further investigations will perhaps some day lead to more precise knowledge of where exactly that great writer lies, without whose works we should know very little of the early explorations of our countrymen.

We have among us this evening perhaps fewer representatives of foreign countries than sometimes we have had the pleasure of seeing here. But I should like to say what pleasure it gives us to see the Peruvian Chargé d'Affaires. His country paid a very graceful compliment to the Royal Geographical Society last year in presenting a bust of its highly honoured President of the past, Sir Clements Markham. Sir Clements was well known for his work on Peru, which he explored, with which he had very great personal sympathy, and of which he wrote a great deal. In commemoration of that the Peruvian Government presented the Society with his bust, and it is a pleasure once more to ask their representative to express to his Government the gratitude of the Society. It is also a pleasure to have here this evening Mr. F. W. Pomeroy, who, with remarkable skill, has reproduced the features of Clements Markham, a man whom he had never seen, and as a result of which we possess a memorial which most of you have seen at the entrance to the Royal Geographical Society's house in Kensington Gore. We had hoped to see here Mr. Wellington Koo, the Chinese Minister, but unfortunately he is away, though he is represented by the Chargé d'Affaires. The Minister has already made a great name for himself as a most active and beneficial member of the League of Nations. He is already a great diplomatist and statesman in the affairs of Europe as well as of his own country. We extend a hearty welcome to Prof. Lingelbach, who fills with distinction the chair of Modern European History at the University of Pennsylvania, and was formerly President of the Philadelphia Geographical Society. It would be interesting to hear from his lips how far he considers that the precepts of history and the laws of geography

have been observed and applied in the great Peace Treaty of Versailles. Among the British diplomatists present this evening, I may mention Mr. E. C. C. Wilton, our Minister to the Baltic States, who is also a great traveller and expert in geography. There are few of the great cities of China that he does not know intimately and that he has not visited officially. He has made a name since the war as High Commissioner at Teschen, a place very few of us knew much about until it led very nearly to a renewal of the war, a catastrophe which Mr. Wilton assisted in averting. I must not forget Lord Rothschild, whom we have much pleasure in welcoming. He has done much for the cause of science with his wonderful collections and the expeditions he has sent to many parts of the world. The President has already mentioned the members of the Mount Everest Expedition, but there are others present this evening also connected with that expedition to whom the Society is very greatly indebted. We have with us Dr. Hill, who has just succeeded Sir David Prain as Director of Kew. Both these gentlemen have rendered very great help in everything connected with the seeds and plants that were brought back by the Mount Everest Expedition, especially in the proper distribution of the seeds. There are also Mr. Edward Arnold, the publisher of the book on Mount Everest; Mr. Will of the *Graphic*, who helps the Expedition by publishing its beautiful photographs; and Mr. Unna, who has devoted an immense amount of work to everything concerned with the provision of the apparatus for supplying oxygen to the climbers. I should like to say how glad we are to see here this evening Mr. Russell Flint. Water-colour painting has never been carried to a higher point than he has carried it, as all may see who visit the exhibition of his works in Bond Street. It is indeed a misfortune that a disability incurred in the service of his country has made it impossible for him even to come forward at all for the position of artist-painter to the Mount Everest Expedition, on which we should have been very glad to see him. That was impossible, but it is a pleasure to express to him the regret we feel in his not having been able to offer himself for that position.

If any particular note has been struck in the selection of our guests this evening, it is perhaps a literary note. We have with us two very distinguished writers—Edmund Gosse and Alfred Noyes. I drop the "Mr." here, because they have long got past the period when that word was added to their names. We consider we know them too well to "Mister" them; they are plain Edmund Gosse and Alfred Noyes. Edmund Gosse shows no relaxation in his capacity of providing us with the most charming literature. He has lately produced a volume of 'Impressions' which has delighted us all, and I think many of us look forward every week to the charming criticisms and sometimes rather pungent observations on the literature of the day, which are always put before us in the most delightful language. Does any one present say that Edmund Gosse has had nothing to do with geography? If so, they must be ignorant of what he has told us in the memorials of his early days. And those who do not know how much he owes to geography have evidently not remembered that well-known classic, 'Father and Son,' in which he tells us that geography was the study of his special choice, and we gather from it that it came to him naturally. It seemed to soak in at every pore without an effort, and we are told that there was a neighbouring pond or lake in the grounds of the house in which he lived, along the margin of which he used to construct imaginary bays, ports, harbours, and try to reproduce the islands of the West Indies, and lost no opportunity of indulging his special taste for geography. I only regret one thing; that is, that Mr. Fisher is not here this evening, because

we could point to Edmund Gosse as a proof that geography is an admirable foundation, one of the essential foundations, for a most distinguished literary career. And Mr. Fisher would no doubt speed up the study of geography in every school and college in England.

We have with us also Alfred Noyes, who has written much that I cannot pretend to talk about this evening. But I want to remind you all that he, too, is a great traveller and has written about travellers and explorers. He has written an epic poem on Drake, and his last work, which is in the hands of so many of us and with which we are so delighted, 'The Torch Bearers,' was inspired on a mountain in California, where he went to be present at the inauguration of the great 100-inch telescope, which suggested the happy thought, now translated into verse, that science is as good a subject as some of the older subjects that were thought to be exclusively adapted to epic treatment. He has given us volume I., relating the manner in which the watchers of the skies, the great astronomers, have handed on the torch of their science from generation to generation. He has told us of Copernicus, of Tycho Brahe, of Kepler, Newton, Herschel, and brought us down to our own time. Is it too much to hope that a later volume of this great work will take us over similar ground and tell us of the great travellers and explorers whose memories we honour in this Society? He would, no doubt, introduce such names as Marco Polo, Vasco da Gama, Captain Cook, all the men who have widened our horizons until we are sometimes told there are no horizons left for us to conquer. I do not know if it is impertinent to suggest that we are led to hope that more is coming, and although perhaps it is greedy to ask for more when we have had so much which has delighted us already from his pen, yet I venture to express the hope that some day he may write an epic of geography.

I will not keep you any longer. I may have omitted to mention some of the guests, but at any rate we know they are all welcome. If I have made an important omission you must forgive me. I now ask you to drink to the health of "Our Guests," coupled with the name of Mr. Alfred Noyes.

Mr. ALFRED NOYES, in responding, said: I suppose my only qualification for replying to the toast of "The Guests" this evening is that I am probably the worst geographer in the room; at any rate, I had a little difficulty in finding my way here to-night. But perhaps I can all the better appreciate the hospitality of the Society. It is a very dangerous thing to play with words. Certain famous lines change their meaning rather humorously if you transpose only two words, although the words seem to have almost exactly the same meaning. There are two lines of Byron, for instance:

> "Bring forth the horse. The horse was brought;
> In sooth, it was a noble steed;"

lines which to our grandfathers seemed to be excellent poetry, and probably quite sound natural history; but the transposition of only two words makes all the difference.

> "Bring forth the steed. The steed was brought;
> In sooth, it was a noble horse"

has a disastrous effect. And so, if you take the great saying of Wordsworth that "poetry is the impassioned expression which is in the countenance of all science," and transfer that expression to the countenance of geography, you also run the risk of disaster. One may say with safety, however, that from the *Odyssey* down to the present day a great deal of our poetry has been rooted in geography. The great outburst of poetry, for instance, in the

Elizabethan period was surely kindled very largely by the great new voyages of discovery. It was Hakluyt, with his Bible and his map, who decided that it was not those who were contented with the fortunate islands of mythology, but those who go down to the sea in ships (and those who climb Mount Everest) who see the true wonders of the Universe and the miracle of reality. To come to more recent times, you find that a still larger proportion of our poetry is rooted in geography. It is quite obvious how much of our modern poetry deals, for instance, with one or another feature of the Earth's surface. If that is not geography, what is?

"God gave all men all earth to love,
But since man's heart is small,
Ordained for each one spot should prove
Beloved over all;
. . . . . .
So one shall Baltic pines content,
As one some Surrey glade,
Or one the palm-grove's droned lament
Before Levuka's trade.
Each to his choice, and I rejoice
The lot has fallen to me
In a fair ground—in a fair ground—
Yea, Sussex by the sea."

That is one aspect of geography. But there is another and a deeper note in some of our modern poetry. You will find it in the work of the finest artist in nineteenth-century literature, whom it is now possible to mention with respect in these Bolshevistic days, thanks very largely to the way in which one of the guests here to-night—Mr. Edmund Gosse—has fought the battle of true literature, not against the *new*, but against the false and destructive forces. You remember how Tennyson, the finest artist of the nineteenth century, compressed into four stanzas the whole history of geology:

"Might I not say, 'Yet even here,
But for one hour, O Love, I strive
To keep so sweet a thing alive'?
But I should turn mine ears and hear

"The moanings of the homeless sea,
The sound of streams that swift or slow
Draw down Æonian hills, and sow
The dust of continents to be."

You remember, again, the wonderful lines whose quietness has been mistaken for weakness, though they have the precision of a Huxley and the epic strength of Homer:

"There rolls the deep where grew the tree.
O earth, what changes hast thou seen!
There, where the long street roars, hath been
The stillness of the central sea.

"The hills are shadows, and they flow
From form to form, and nothing stands;
They pass like clouds, the solid lands,
Like clouds they shape themselves and go."

That is another aspect of geography. There was a time in the days of Darwin and Tennyson when a wild rumour was afloat that science was going to destroy poetry and religion, but the greatest poet of that period was not of the same opinion; and it was only held by those unimaginative people who never realized the stupendous mystery of the universe revealed by science, or the firm reality of the subject matter of poetry. It was said that science was going to destroy poetry and religion. To-day I think it may be said that they are all drawing closer together. By a curious coincidence we have had this view supported quite recently by our greatest and most unflinching living writer, Mr. Thomas Hardy. It is said, and it is perfectly obvious, that science, poetry and religion are joining their forces again. Every step that science takes to-day is a step towards poetry, and every step that true poetry takes to-day is a step towards exactitude, and therefore towards science. I do not speak of the nonsense that has been flung at us by those Bolshevistic writers of the present generation, who merely wish to destroy the standards, to make things easier for their own incompetence.

If one asks what is the meaning in poetry, for instance, of that perennial fascination of the remote far away, and all that travelling to and fro, and searching up and down in the Earth which we celebrate in so many songs of travel, I think one can answer best in a little fable that Robert Louis Stevenson incorporates in one of his Essays. He relates how a party of pilgrims encountered once a very old man shod with iron. The old man asked them whither they were going, and they answered with one voice, "To the Eternal City." He looked upon them very gravely. "I have sought it," he said, "over the most part of the world. Three such pairs as I carry on my feet have I worn out upon this pilgrimage, and now the fourth is growing slender underneath my steps, and all this while I have not found the City." And he turned and went his own way alone, leaving them astonished.

Perhaps we have not found the city, but in the present day I think it may be said, in spite of all the forces working for disruption and chaos, that with the help of science we are beginning, at any rate, to realize where we want to go, and that is perhaps the most important thing of all. The age of sick doubt is over to that extent. Science is gradually persuading mankind that the majestic sequence of events in the universe is ruled not by chance but by law, and that the law is now and for ever a lantern to our feet; that there is neither chance nor vindictiveness in the law; that even pain and evil may be necessary results of that constancy of law which saves us from chaos; that it is better, for instance, to be injured by the law of gravitation than to be the playthings of a capricious universe; and that in the law abides our only and perfect freedom. The very thing which we thought was going to crush out freedom, the reign of law, is our only safeguard, the condition of our freedom. Knowledge of the law is not only power, but it is freedom, and it may be that we shall have to turn to science for the answer to some of our political problems. If our politicians cannot find the answer to Bolshevism, perhaps science—carefully explaining that two and two still make four—will eventually find it for us. If art and letters are menaced by licence and formlessness and Bolshevism, then perhaps it may be partly to science—certainly it will be to the human reason—that the world will look for an answer to some of our perplexities, and the answer of science and reason will be "the law." Even now, can we not hear science announcing her hope through the voice of the greatest poet of the nineteenth century, and pointing the new geographers to the greatest Odyssey of all?—

"Come, my friends,
'Tis not too late to seek a newer world.
Push off, and sitting well in order smite
The sounding furrows; for my purpose holds
To sail beyond the sunset, and the baths
Of all the western stars, until I die.
It may be that the gulfs will wash us down:
It may be we shall touch the Happy Isles
And see the great Achilles, whom we knew."

Sir RENNELL RODD, in proposing the toast of "The Society," said: It is my privilege to propose the prosperity of the Royal Geographical Society, an institution based upon so sure a foundation of honourable achievement and world-wide esteem that no words of mine are needed to enhance it. I may perhaps, however, be permitted to say how gratifying it has been to me to be invited to propose this toast, because I have always taken pride in a family association with this Society which is almost coeval with its foundation. My great-grandfather, who has been called the father of English geography, Major Rennell, was indirectly associated with its foundation, inasmuch as he was one of the original members of its historic predecessor, the Raleigh Society, incorporated in the year 1827 by a group of travellers and friends who had visited every known part of the Universe. It was, in fact, his intimate friend, Admiral Smyth, with whom he was in almost daily contact in matters of geographical interest, who did most of the pioneer work which led to the foundation of this Society in the spring of 1830, a few weeks after the death of Major Rennell. My own grandfather, his son-in-law, was one of the original members of the Council. My father was a Fellow for upwards of sixty years, and I think that my own association with the Society dates back to more than thirty years ago. The tradition will, I trust, be continued by my son, who, after a preliminary course of study at Kensington Gore, has lately started on a difficult expedition through North-Western Africa to countries very little known, and I sincerely hope that the results of that expedition, ethnological as well as geographical, will on his return in a year's time be duly communicated at one of our meetings.

Only a few days ago, at the annual dinner of the Royal Literary Fund, I was drawing attention to a certain aspect of literature as a bond of international union, and I think that all that could be said of literature may also be advanced as regards geographical studies. There seems to have been a sort of general outburst of geographical interest over the world which led to the foundation of Geographical Societies in Paris, in Berlin, and in London, all within a few years of one another. Such societies, as my long residence in foreign countries has led me to know, work together in a cordial spirit of co-operation. There is no chauvinism, no jealousy among their members, but a universal expression of regard and esteem for the achievements of their international associates. I had reason during the Great War to appreciate the value of the co-operation of the Geographical Society at Rome. Our friend Sir Filippo De Filippi is a sort of living link between our Society and the Society of Rome; and we have had no warmer friend than its Honorary President in those days, that gallant sailor Prince whose experience embraces the Arctic Circle, the summits of Ruwenzori, and the loftiest peaks of the Karakoram—the Duke of the Abruzzi. I also remember, almost with emotion, the high tribute paid to the work of this Society and addressed to me as Minister in Stockholm some years ago by the President of the Swedish Geographical

Society, on the twenty-fifth anniversary of the return of the Nordenskiöld Expedition.

As an old public servant I have had reason to appreciate the valuable support which this Society has constantly afforded to the State. I have seen in early days in East Africa the stimulus and support given to those men who are now recognized as pioneers of Empire in what is no longer the Dark Continent, no longer a land where "geographers in making maps with savage tribes fill up the gaps." But our Society, like all associations of its kind, lives by the virtue of its individual members, and in speaking of the Royal Geographical Society one's temptation is to spend the time at one's disposal in praising famous men. Yesterday at the Anniversary Meeting the President drew attention to some of the gaps in our ranks. Lord Bryce is universally regretted by all the learned societies of the United Kingdom. We have lost that gallant comrade in the path of adventure, that bold leader of men, Sir Ernest Shackleton, who in his constitution united authority and poetic imagination in that rare combination which lifted the old adventurers of Elizabethan days on to the higher plane of romance. But there is one to whom I should like specially to refer, and that is Sir John Kirk, for so many years Foreign Secretary of this Society. I went to Zanzibar in East Africa only some five or six years after his withdrawal, and I was therefore able to appreciate how the power of his spirit survived, and to see the aftermath of the seed which he had sown. The companion and assistant of Livingstone in his great voyage, he became a great public servant. It was his extraordinary influence over the intelligent and far-sighted Sultan of Zanzibar which redeemed the Metropolis of East Africa from a secular reproach. And I do not know whether in this country people have ever wholly appreciated the last great service which he rendered his country in preparing the road for the concession by that Sultan to Sir William Mackinnon of those regions which were thus eventually saved to the Empire in the scramble for Africa by the Imperial Chartered British East Africa Company. The life of that Company was short, but it was a very brave adventure, and it secured Uganda and Kenya to the Empire. In mentioning Sir William Mackinnon I sometimes feel a word of acknowledgment is due to our often ignorantly criticized Foreign Office, which in those days had the control of the Protectorates and little-known countries. Believe me, gentlemen, for I have lived there and seen it, it was our Foreign Office which, without any material support from the British Treasury, with the assistance of a handful of men of faith and constancy and two or three small cruisers patrolling an inhospitable coast, clung with tenacity to the African dream until the opinion of this country had ripened and matured sufficiently to insist that the work of the pioneers should not be abandoned. Let us therefore on this occasion think with respectful homage of that great man Sir John Kirk, and his friend, Sir William Mackinnon, with whose names those of my old friends, Gerald Portal, Lloyd William Matthews, and Sir Harry Johnston, will ever be associated in the story of East Africa.

In conclusion, let me say that the Royal Geographical Society has been particularly fortunate in the list of its Presidents. As the years of the Society increase there has never been any difficulty, year after year, in finding the right man, fitted by his record of achievement, to occupy that high position. In fact, it is, I think, a good omen for our Society that to be selected to fill that high office has almost now come traditionally to be regarded as conveying a public recognition of great public services. And in saying this you will pardon my going back even to a penultimate President because of his great services

to the Society. We have learned that after a terrible time of strain and anxiety which might well have undermined a constitution of tougher fibre he has been obliged, temporarily we hope, to withdraw from active service and to take a long rest. Therefore I should like that a message should go out to Lord Curzon of goodwill and of hopes for a speedy recovery.

The Chairman has already expressed his regret that another long anterior engagement has prevented the President-elect from being here to-night. His absence perhaps may be less regretted by myself, for it renders it more easy for me to praise him. Lord Ronaldshay has been one of those who realized the importance of equipping himself by personal investigation and the accumulation of experience before undertaking administrative work, and the administrative work which he has just given up has, I think, not the least for that reason been particularly successful during a period of crisis and great anxiety. He has visited almost every portion of the continent of Asia—Asiatic Turkey, Siberia, Central Asia, Persia, India, Burma, China, and Japan—and you all know the results of his travels embodied in the works that he has published. I think the selection of such a man to preside over our destinies augurs well for the future encouragement of research and discovery.

As to our outgoing President, my task is more difficult because he is sitting in the Chair. I dare say there are not a few present to-night, contemporaries of my own, who remember the deep interest that was stirred in the 'eighties by the revelation of his journey through Manchuria and Chinese Turkestan when travelling was less easy and less common than to-day; or his remarkable expedition to that "high mountain cradle" of the Oxus in Pamir, in days when that name occupied such an important place in the public interest. But perhaps most of all we associate his name with that country over which before his time an impenetrable veil had hung—the mystery world of Tibet. The three years of his administration as President of the Society have been largely occupied with the work of reconstruction after the disabilities and dislocations of the Great War had rendered it well-nigh impossible to maintain in full power the energies of such a Society as ours. For the way in which that work has been done our hearty thanks are due to him and all those who have worked with him, and not the least to our energetic Secretary. But of course the outstanding event of his Presidency which will render it ever memorable is the Mount Everest Expedition of which so much has been said this evening. I will add only that it is a very gallant adventure and congenial to the spirit of our countrymen. I believe that throughout the British Dominions men are waiting with breathless interest for the news for which we shall now not have to wait very long; and when, as we all trust, we receive the news that that gallant band of men have conquered in the great battle with the monarch of mountains, we shall remember the work that was done in promoting their efforts by our outgoing President. I therefore give you the health and prosperity of the Royal Geographical Society, coupled with the names of Lord Ronaldshay and Sir Francis Younghusband.

The PRESIDENT: On behalf of the Society I thank you very warmly for the welcome which you have given the toast, and it is a very special pleasure to me and not only to the Society that that toast has been proposed by a member so long connected with our Society as Sir Rennell Rodd. We had hoped to ask Sir Rennell Rodd to serve on our Council, so that he would be more closely connected with us, but unfortunately he will not be in England during the coming session, and so we were precluded from having him on our Council. It would, however, have been greatly to our advantage if we could

have had one like Sir Rennell Rodd, who has travelled in many parts of the world, whose family has been so closely connected with the Society, and who is by instinct and by training so deeply imbued with the true spirit of geography. Sir Rennell has made kind reference to my work as President, and he referred to one of my predecessors, Lord Curzon. I should like to take this opportunity of saying that the work of the President, and of all future Presidents, has been very greatly facilitated by the amount of work which Lord Curzon, with his usual ability, devoted to the service of this Society. He put the Society on a sound basis and footing, so that the work of all future Presidents was made easy. It was, therefore, with that basis established and the splendid staff that there is in the Society, an easy task for me to carry on when you did me the honour of electing me as your President.

I remember when I was Presidend-elect I made in the course of my speech a statement which I intended to be the real point of that speech: that when I came and took up the duties of President the one thing that I would devote myself to was to encouraging the spirit of adventure. That I hope I succeeded in doing. If you want to encourage the working of a particular principle the thing is to adopt one concrete example of it and devote your attention to that. Well, there was one great concrete example staring me in the face, and that was Mount Everest. The Poles had both been visited. There was Mount Everest which no man had been within 60 miles of, and there were very eager spirits, I believe, in this country who were only too anxious that they might have the honour of displaying their energies in that part. It was, therefore, to this Mount Everest Expedition that I devoted myself especially, and that Expedition was ably begun by Colonel Howard-Bury. But there was another point which I realized and which I believe all true explorers realize: that besides the pleasure and besides the pure science, they do like to have the spirit of the artist also with them. We have not the means of expressing ourselves, but we are only too glad when we can get others to save us the trouble by expressing our feelings with more adequate force. It is for that reason that we in our gatherings always try to have present some distinguished representative of those arts, and I am sure that those who listened to Alfred Noyes this evening do realize the very important part his art plays in our science. He can express for us, as I say, what we, unfortunately, are unable to express accurately for ourselves. All those who listened to Colonel Howard-Bury when he was describing his feelings when he was in sight of Mount Everest must have felt something of what we who visit the far regions of the world are also feeling.

The toast was that of the Royal Geographical Society coupled with my own name and with the name of the President-elect, Lord Ronaldshay. It is a very great misfortune that he is not here present with us this evening. But, as I have said, and as Sir Rennell Rodd has said, we are extremely fortunate in having a man like Lord Ronaldshay to undertake the duties of the President of this Society, and I am certain he will carry on the high traditions of our Society. I thank you very much indeed for your kind welcome this evening, and I am sure the remaining six months of my Presidency—for Presidents of this Society take a long while to die; in fact they never die entirely, because as soon as they have ceased as President they are reincarnated as Vice-Presidents—I will do my utmost to carry on.